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A

BIENNIAL RETROSPECT
OF
MEDICINE, SURGERY,
AND THEIR
ALLIED SCIENCES,
FOR
1865-6.



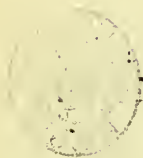
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REPORT

ON THE

PROGRESS OF PHYSIOLOGY AND THE ALLIED SCIENCES

DURING THE YEARS 1865 AND 1866.

BY

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IN drawing up the following report upon the progress of physiology, histology, and histological chemistry, during the past two years, it will not be possible, in the limited space at disposal, to do more than notice some of the most important of the numerous papers that have been published in that time; and it is worthy of observation that, of these three subdivisions of biology, histology, or the microscopical investigation of the tissues, has been most assiduously cultivated, and has received the greatest extension and development. The excellence and cheapness of the microscopes that can now be purchased both at home and abroad, the small amount of additional apparatus required for investigations of this nature, the abundance of material, the discovery of the remarkable preservative power of solutions of bichromate of potash and of chromic acid for even the most delicate nervous and glandular textures, enabling the observation of interesting subjects to be postponed to a convenient season, and the facilities which are afforded by the establishment of journals devoted exclusively to microscopical inquiries, for the publication of new and interesting facts, have all combined to open up this field of investigation in an hitherto unprecedented manner, which has certainly yielded, and will continue to yield, fruitful results. Attention may here be briefly called to the introduction of the moist chamber by Recklinghausen, and of the arrangement proposed by Max. Schultze, by which the preparation under examination may be kept at any desired temperature (of which a description will be found in the first volume of his 'Archives of Microscopical Science'), as being both valuable aids to microscopical investigation.

BLOOD.

Commencing with the blood, as the natural and fitting introduction to the examination of the tissues which draw their nourishment from it,

the chief point of interest which attaches to the observations made during the past two years is their bearing on the much-vexed question of the presence or absence of an investing membrane to the red corpuscles. Ofsiannikoff ('Bulletin de l'Acad. Impériale,' t. 8, p. 561) admits its presence on the ground of his having observed distinctly the formation of crystals within the cell-membrane in man, as well as in other animals, whilst the opposite opinion is maintained by Rollett ('Moleschott's Untersuchungen,' Bd. 9, 1865, p. 474) and by Schultze ('Max Schultze's Archiv f. Microscop. Anat.,' Bd. 1, 1865); the former chiefly because of the remarkable effects produced by the passage of electrical currents through the defibrinated blood of the frog, the corpuscles assuming a variety of forms, allowing the escape of their nuclei, and ultimately coalescing to form viscid masses of considerable size; and the latter on account of the changes which he has noticed in the corpuscles of blood examined microscopically on the above-mentioned stage, at the normal temperature of the body (100° Fahr.). Under these circumstances the *white* corpuscles of the blood exhibited the most lively and vigorous movements, not only of form, but of location, processes being thrown out in all directions, giving rise to the most bizarre forms, and, as in the case of the *amœbiform* cells, being frequently followed up by the entire corpuscle, whilst in many instances a still more striking resemblance to these cells was afforded by the absorption into their interior of various colouring matters and minute granules, as those of carmine, indigo, and milk. As regards the *red* corpuscles, although Schultze was never able to perceive any change of place, such alterations in their form were observed as were, in his opinion, incompatible with the presence of a proper cell-wall. E. Neumann ('Reichert's Archiv f. Anat. u. Physiologie,' 1865, Jan. 1866) gives an undecided opinion on this point, observing that, whilst the effects of the passage of electrical currents through defibrinated blood incline him to agree with Rollett, and to deny the presence of a cell-wall, other experiments that he has undertaken, showing the action of phosphoric acid on the corpuscles, lead him to admit its existence, since under the influence of this agent the corpuscles gradually swell up and finally burst.

The curious movements of the blood-corpuscles that have just been referred to appear to be identical with those observed by Frey ('Das Microscop,' 1865, p. 142) in pus-cells obtained by exciting inflammation in the eye of the frog, by Ecker and Schlüter in the corpuscles of the saliva, by Lavalette St. George ('Schultze's Archiv f. Microscop. Anat.,' Bd. 1, Ht. 1, p. 68) in the cells contained in the tubuli seminiferi of many animals, by Grohe ('Virchow's Archiv,' Bd. 32, Ht. 4, p. 445) in the cells of a fibro-cartilaginous enchondroma, by Kühne in the cells of connective tissue and of the cornea, and by Cohnheim ('Virchow's Archiv,' Bd. 33, Ht. 2, p. 314) in the large blood-corpuscle-holding cells of the spleen-pulp.

The question whether these movements are purely physical or are of a vital, that is to say, of a muscular nature, is difficult to determine. Reichert ('Reichert's Archiv,' 1865, Ht. 6, p. 749) seems to regard the movements of the sarcode of the lower animals, to which class all the cell movements above mentioned may be referred, to some modification of ordinary muscular tissue. Hofmeister ('Verhand. des Heidelb. Nat. Hist.

Med. Vereinsch.,' Heft 3, p. 177), whilst admitting this, seems to regard them as essentially produced by a periodical increase and diminution of the capacity of imbibition of the protoplasm for water, which is occasioned by the varying dimensions of certain vacuolæ that he has observed to be of constant occurrence in their interior.

Mantegazza ('Gazetta Med. Ital.,' 1865) describes an instrument by which the number of red corpuscles in a cubic millimètre* of blood can be ascertained. He considers that in a healthy man the average number would be from 5,000,000 to 5,125,000; in a healthy woman, from 4,125,000 to 4,875,000; in extreme anæmia, from 1,875,000 to 2,375,000; and in a plethoric woman the number was 5,500,000. Rosy or pallid cheeks, as abundance of other evidence shows, furnish no certain indications of the relative amount of corpuscles present.

Dr. P. L. Panum ('Virchow's Archiv,' Bd. 29, 1864, p. 481) found that the blood of newly born dogs contains a larger proportion of solids than that of the mother, the latter having in 1000 parts about 138 parts of solid residue, in the former proportions varying from 192 to 228 parts.

An interesting observation on the pneumatology of the blood in disease has been made by MM. Estor and St. Pierre ('Mémoires de la Société de Biologie,' t. 1, ser. 4, p. 31, 1865), who have shown that the venous blood returning from an inflamed part often contains twice as much oxygen as that on the sound side, and they attribute to this circumstance the brighter tint such parts possess.

LYMPHATIC SYSTEM—ABSORPTION.

As regards the origin and structure of the lymphatics, Giannuzzi ('Bericht. der Kön. Sächs. Gesellschaft der Wissenschaften,' 1865) describes the lymph-vessels in the submaxillary gland of the dog as commencing in fissures and splits of the connective tissue, of which the finest surround the acini of the gland. They open on the one hand under the connective tissue that bounds the acini, and on the other hand into spaces which surround the branches of the excretory ducts and the accompanying vessels and nerves.

Wywodzoff ('Wien. Med.-Jahrbücher,' Bd. 11, 1, p. 3) found that the lymphatics of the lungs in the dog and horse originate as spaces in the pareties of the alveoli, destitute of proper walls. The lacunæ do not pursue the same course as the blood-capillaries, but frequently cross them. They first obtain a proper investment, viz., a tunica interna, on emerging from the alveolar walls, and the vessels are first supplied with valves after they have entirely left the pulmonary tissue.

N. Chrzonszczewsky ('Virchow's Archiv,' Bd. 35, 1866 p. 174) maintains that the finer and more delicate lymphatics originate in the network formed by the anastomosing processes of the connective-tissue-cells.

His ('Siebold und Kolliker's Zeitschrift f. Wiss. Zool.,' 15, 1865, p. 127; see also J. Dean in 'American Academy of Arts and Sciences,' 1860) has particularly examined the somewhat irregular spaces or lumina which are familiar to most microscopists as surrounding the blood-vessels of the nervous centres. He regards these perivascular spaces

* A millimètre is about 1-25th of an inch.

as the lymphatics of these parts, partly on account of their form, size, and mode of branching, and partly because they can be directly injected from the lymphatics of the pia mater. Other microscopists, however, as Frommann, attribute the appearances in question to retraction of the tissues, consequent on the mode of preparation. His believes that the perivascular spaces act both as reservoirs for the nutritious fluids and also serve as a means of protection for these important parts against pressure, serving the same purpose for each individual segment of the nervous system that the liquor cerebro-spinalis does for the whole organ.

When a solution of nitrate of silver is injected into the lymphatics the parietes of the smaller vessels are found to present certain wavy [dark lines. Two explanations have been given of the cause of this appearance; V. Recklinghausen refers it to the staining of the tissues intervening between the epithelial cells and connecting them together; whilst Auerbach ("Researches on Lymph and Blood-vessels," 'Virchow's Archiv,' Bd. 33, p. 340) thinks it due to the combination of the silver salt with thread-like masses of albuminous and saline materials lying in fissures of the vessels. The lines vary in breadth, and this appears referable, in part at least, to the strength of the silver solution.

S. Basch ('Wiener Sitzb.,' Bd. 41), who has paid particular attention to the commencement of the lacteals in the villi, regards these vessels, in opposition to Teichmann and others, as only large and regular-formed spaces, possessing neither a proper wall nor an epithelial lining, the illusory appearance of the latter being due to the presence of lymph-corpuscle-like bodies, belonging to and forming part of the proper connective tissue of the villus.

Great discrepancy of opinion, it is well known, exists as to the mode in which oleaginous and other constituents of our food gain entrance into the lacteals, some admitting with Heidenhain that the cells which cover the intestinal surface of the villi present open mouths at their free extremities, and possess caudate processes at their attached ends, which are prolonged into the tissue of the villus, and either enter into direct continuity with the central lacteal or are indirectly continuous with it through the connective-tissue-corpuscles, in either case a system of canals and passages being formed, through which fine particles of any foreign body may easily enter; whilst others hold that the cells of the villi are certainly closed, that all absorption is effected by true osmosis or through the exquisitely fine pores of the membranous structures, and that when particles of solid or fluid matter have been observed to gain entrance into the lacteals it has been in consequence of mechanical lesion of the mucous membrane. Some interesting observations have recently been made by L. Letzerich ('Virchow's Archiv,' 1866, Bd. 37, Heft 2), which, if corroborated by other observers, will serve to elucidate the process of absorption of fat, and to explain the conflicting statements that have been made. He believes that he has been able to distinguish two kinds of cells on the surface of the villi. One of these is the ordinary columnar epithelial cell, with closed extremities; whilst the other consists of a spherical, pear-, or spindle-like body, the free extremity of which, turned towards the intestine, is wide open, whilst the other or attached end is tapering, penetrates the basement membrane, and discharges its contents into a kind of plexus,

the wide meshes of which surround and are in direct continuity with the central lacteal. These special absorbent organs are much fewer in number than the proper epithelial cells between which they are interspersed. Oleaginuous corpuscles can easily be seen in them, especially in the hedgehog; but he has never found fat-molecules enter the true epithelial cells, except under abnormal circumstances, as when an excessive amount of fat has been forced into the animal's stomach,

The lymphatics of the intestine have received careful attention from Auerbach ('Virchow's Archiv,' Bd. 33, p. 340, 1865), who states that the delicate vessels usually regarded as lying immediately beneath the peritoneum are in reality situated between the longitudinal and circular layers of muscular fibres, and constitute only the largest collecting trunks of a very much closer network of lymphatics that everywhere penetrates and interlaces with the fibres of the circular muscular tissue, and is in direct connection with the chyle-passages. He therefore admits the presence of two layers of lymphatics in the intestines, one being the ordinary submucous layer of lacteals, and the other being an interlamina layer occupying the space between the two layers of muscular fibres, and also lying constantly to the inner side of the nervous plexus (plexus myentericus) which is found at this point. He has observed the presence of chyle in both sets of vessels. As regards the structure of the finest capillaries, he considers that they possess proper walls, composed of a perfectly clear, transparent, and homogeneous membrane, on the inner surface of which are nuclei that, when injections of nitrate of silver, as recommended by Recklinghausen, are employed, may readily be perceived to be the nuclei of a very regularly arranged layer of tessellated epithelial cells. In the very finest lymphatic capillaries of the intestines he appears to think that these cells, firmly adhering to one another by their edges, may alone constitute the limiting membrane.

Dähnhardt ('Virchow's Archiv,' 1866, Bd. 37, p. 55) has had an opportunity of examining lymph which flowed in large quantities for many months from the thigh of a patient suffering from hypertrophy and other disease of the subcutaneous connective tissue of the leg, and which, consequently, cannot be regarded as perfectly normal. The lymph presented a whitish opalescent appearance, had an alkaline reaction, and a specific gravity of 1.007. On standing, a fibrinous coagulum separated, and the fluid quickly became putrescent. It contained about 15 parts of solid substances in 1000, and of these from 4 to 7 parts consisted of fibrine, albumen, fat, and organic extractive matters, and the remainder consisted of mineral salts, of which chloride of sodium was by far the most abundant. In this case, as pointed out by Prof. Hensen, the proportion of organic to the inorganic constituents is remarkably low as compared with other analyses.

The most interesting observations that have been made on the physiology of absorption are those by Dr. Bence Jones and M. Dupré ('Proceedings of the Royal Soc.,' vol. 15, p. 220, and vol. 15, p. 73), on the rapidity with which the salts of lithia and quinine are taken up, and the rate of their passage through the various tissues of the body. The presence of extremely minute traces of either of these substances can be readily ascertained, and the results of their careful inquiries show that in guinea-pigs a few grains of chloride of lithia given on an empty

stomach may diffuse itself into all the vascular textures, and even into the cartilage of the hip-joint and aqueous humour of the eye, in the short space of 15 minutes. In young guinea-pigs it appeared in the lens in about 30 minutes. In old guinea-pigs it had permeated every part of the lens in about 4 hours. It appears to pass away from the system altogether in about 3 or 4 days. In man 5 or 10 gr. doses of carbonate of lithia may appear in the urine in from 5 to 10 minutes, if given upon an empty stomach, or in 20 minutes on a full stomach; and it may continue to be eliminated for 6, 7, or 8 days. In $2\frac{1}{2}$ hours traces may be detectable in the lens, and in 7 days it may have altogether disappeared. The experiments with quinine led to still more interesting results, as they showed that a peculiar fluorescent substance, which they have termed animal quinoidin, and which closely resembles quinine in all its properties, is very generally distributed through the different textures of the body, and is especially abundant in the lens, where its presence may readily be shown during life by the electric light. On careful examination of the amount of increase of fluorescence occurring after the administration of quinine, they arrived at the conclusion that in guinea-pigs quinine has certainly permeated in 15 minutes all the vascular and most probably all the non-vascular tissues, whilst in 48 hours it has nearly all passed out again from the system. From similar experiments on cataracts in man it appears that in $2\frac{1}{4}$ hours traces of quinine may be found in the lens. It begins to appear in the urine in from 10 to 20 minutes after ingestion; in from 2 to 3 hours it has reached its maximum; in from 3 or 4 to 8 hours, at longest, it begins to decrease; in 24 hours it has very much decreased, in 48 hours its presence is still detectable, but in 72 hours not a trace of it can be found.

It must be understood that these experiments do not in any way indicate the actual rate at which the old materials of the tissues are exchanged for new, but rather constitute a measure of the permeability of the tissues for the substances in question, and show that the serous or lymphatic fluids with which all parts are naturally moistened, and from which they draw their nutrition, are perpetually undergoing renewal.

Experiments similar to those of Dr. Bence Jones and M. Dupré have been performed by G. Colin ('On Absorption effected by the Lymphatics, &c.,' Paris, 1863; 'Canstatt's Bericht,' 1865, p. 104), and by Eulenberg ('Hermann's Medicin Centralblatt,' 1865, p. 529).

Colin inserted a canula into the thoracic duct of a dog, and found that when iodide of potassium was injected into the stomach it appeared in the chyle in from 18 to 20 minutes, and altogether disappeared in from 6 to 15 hours; when injected into the small intestine it appeared in 6 minutes; after subcutaneous injection in the lip of the horse it appeared in 7 minutes, and remained for 4 hours in the glands of the neck. The salt appears more quickly after subcutaneous injection in the lymphatics than in the veins.

Eulenberg found that iodide of potassium injected subcutaneously into the neck appeared in parotidian saliva in from 1 to $1\frac{1}{2}$ minutes, when into the lower limb in from $2\frac{1}{2}$ to 5 minutes, and when into the stomach in from 20 to 45 minutes. Evidence of its presence could be obtained after 24, 36, and even after 48 hours.

The nature and properties of the fluid secreted by the Lieberkühnian follicles of the small intestine has recently been elucidated by the experiments and observations of L. Thiry and W. Kühne (see "Kühne's Lehrbuch der Physiologischen Chemie," art. "Der Darmsaft," Heft. 1, p. 136, 1866). To obtain it in a pure state, a fine healthy dog is selected, and placed under the influence of chloroform. The abdomen is then opened, a loop of intestine drawn out and divided at two points about 8 or 10 inches from one another. The continuity of the intestinal canal is now provided for by uniting the cut extremities with a fine suture. One extremity of the detached loop, the mesenteric relations of which are undisturbed, is now ligatured, and the other is connected with the cutaneous wound. If the animal recovers from the peritonitis excited by the operation, an intestinal fistula is established, the orifice of which ultimately becomes very small, and from which the true intestinal secretion can be obtained in considerable quantities by irritating the surface with sponges, the introduction of a little dilute hydrochloric acid, or the application of an interrupted galvanic current. The fluid thus obtained is thin, of a clear straw-yellow colour, gives a strongly alkaline reaction, and evolves carbonic acid on the addition of acids. Its sp. gr. is constantly 1.0115. It contains about 2.5 per cent. of solids, namely, of albumen 0.8, of other organic matters 0.73, and of ashes 0.87 parts. According to Thiry's observations, it does not convert starch into sugar, does not decompose the neutral fats (butter), and does not dissolve either coagulated albumen or raw meat. It has some action on fibrine; but, according to Kühne, only on account of its primary alkaline reaction. It can scarcely be doubted, however, that this fluid, so abundantly poured forth that it has been calculated that about 5500 grs., or nearly three quarters of a pound, is secreted within five hours of a meal by the intestine of a dog, possesses an important agency in the metamorphosis of alimentary substances; for it must be remembered that in natural circumstances the food has already, in previous portions of the intestinal tube, been subjected to the action of the salivary, gastric, pancreatic, and biliary secretions, which are known to effect marked alterations in the chemical composition of the several classes of nutritive material; and observations are still wanting to show in what manner the intestinal juice acts upon the food that has undergone these preparatory changes.

LUNGS—RESPIRATION—ANIMAL HEAT.

The observations made on these subjects during the past two years have been remarkably few, probably on account of the recent extended and exhaustive labours of Dr. Edward Smith. As regards points of structure, Frey, Wywodzoff, and Hirschmann, all admit the existence of an epithelial investment to the alveoli of the lungs. Wywodzoff terms it discontinuous; Frey leaves it undecided whether the epithelium is interrupted or continued in some modified form over the capillary vessels.

The results obtained by M. Hirschmann ('Virchow's Archiv,' 1866, p. 335) are thus summed up by Prof. Chrzonszczewsky in a postscript to his paper:

1. The epithelial covering of the capillary bronchia is continued into the infundibula, and from thence in a perfectly unbroken layer into the

air-vesicles themselves. The epithelium consists of tessellated cells, arranged in a single layer. This is in complete accordance with Prof. Chrzonszczewsky's formerly expressed views, and is the more satisfactory as in Hirschmann's experiments the use of nitrate of silver solution was avoided.

2. The smooth muscular tissue, likewise, does not cease in the finest branches of the bronchia, but enters into the structure of the terminal organs of the respiratory apparatus, although the thickness of the bundles may be reduced to two or three fibres.

W. Weyrich ('Observations on the Proportions between the Insensible Perspiration of the Lungs and Skin,' Dorpat, 1865, 8vo), from experiments made on himself, finds that the temperature of the expired air is decidedly lower than that of the axilla, the temperature of the latter, upon a mean of 200 observations, being 99.44, whilst that of the expired air was only 97.41. The temperature of the axilla rose with tolerable regularity from 6 a.m. to noon, then fell slightly till 2 p.m., and again rose to its greatest height at 7 p.m., after which it gradually fell till it had reached the same level as at 6 a.m. The temperature of the expired air followed similar variations. It attained its maximum, however, earlier in the morning, and diminished more slowly towards midnight, standing at that hour much higher than at 6 a.m. Alterations in external temperature were followed much more quickly and distinctly by variations in the temperature of the expired air than in that of the axilla. The former also rose more quickly after food. Retention of the air within the lungs for 10—15 seconds caused the temperature to rise half a degree Fahr. As regards the amount of insensible perspiration by the skin and lungs, Weyrich estimates it to be for a man weighing 125 lbs. about 14,500 grains = 2 lb. avoird. per diem., and the water discharged by the skin to that of the lungs to be as 2 : 3.

The importance of a knowledge of certain facts in reference to the elevation of the temperature of the body in certain diseases led Tscheschichin ("On Animal Heat," 'Reichert's Archiv,' 1866, pp. 151—179) to undertake a series of experiments, with a view of determining the effect of injuries to different parts of the nervous system, as the brain, spinal cord, sympathetic nerve, and pneumogastric; and upon the effects of certain poisons—nicotin, curara, alcohol, and putrefying blood-serum, on the animal temperature.

The experiments were performed on rabbits.

He draws the following conclusions :

1. The spinal cord, containing, as it does, the centres of the circulation and respiration, operates directly upon the organic chemistry, and consequently upon the animal heat.

2. Section of the spinal cord is followed by retardation of the circulation and a congestion of the venous system, in consequence of which the radiation of heat rises and the general temperature sinks.

3. By investing the body with badly conducting materials we can retard or prevent in such a case the falling of the internal temperature; and inversely, the cooler the medium in which the body is placed after section of the spinal cord the quicker is the fall.

4. Since the causes which lead to the increased radiation of the superficial heat consist in the paralysis of the vessels, and in their repletion with

blood, all means by which this paralysis is removed delay or diminish the radiation of heat.

5. All circumstances which occasion the paralysis of the vessels operate in the same way on the radiation of heat as the section of the spinal cord.

6. The cramps produced by certain poisons immediately elevate the internal temperature of the body.

7. In animals poisoned with alcohol, however, the temperature immediately begins to fall.

8. Section of the sympathetic exercises the same influence on the distribution of the general heat of the body as section of the spinal cord.

9. Section of the vagus has no remarkable direct influence upon the animal heat.

10. Section of the medulla oblongata in the skull at the point where it unites with the pons produces violent febrile symptoms.

11. Similar febrile appearances occur after injection of putrefying animal fluids.

12. Physiological experiments and clinical observations establish the existence of moderatory centres (inhibitory) in the brain.

CIRCULATION.

By a very beautiful series of dissections Dr. James Bell Pettigrew ('Trans. Roy. Soc. of Edinburgh,' and 'Phil. Transact.,' 1864, part 3, p. 445) has elucidated the structure of the valves of the veins and the arrangement of the muscular fibres of the vertebrate heart. He observes that the structure of the valves in reptiles is partly tendinous and partly muscular, becoming wholly muscular in birds and wholly tendinous in mammals. From his observations on the heart he draws the physiological deduction that the closure of the auriculo-ventricular valves in mammals is effected partly by mechanical and partly by vital means; the segments in part floating upwards in the blood towards the end of the diastole and the beginning of the systole, till their margins and apices are so accurately applied that no regurgitation can take place, whilst during and towards the end of the systole the valves are by the contraction of the muscoli papillares dragged down by the chordæ tendineæ into the ventricular cavities to form two dependent cones, this downward movement of the segments permitting the blood in the auricles to descend into the ventricles, so as to relieve the congestion of the former. The perfect closure of the auriculo-ventricular valves he attributes to a kind of twisting and spiral movement of the segments of the valves, wedging them closely and firmly into one another. Dr. Pettigrew has dissected out no fewer than seven layers of muscular fibres in the ventricles, the arrangement of the fibres of which, though individually simple, are collectively very intricate, and cannot here be fully exposed.

By the use of nitrate of silver injections Eberth ('Wurzbürger Naturwiss. Zeits.,' 1865, Bd. 6, p. 27) and Chrzonszczewsky ('Virchow's Archiv,' 1866, vol. 35, p. 171) have shown that the finest blood-capillaries are lined throughout by a layer of flat and fusiform epithelial cells, containing well-marked nuclei, and lying on the inner side of the generally admitted structureless membrane. In the smallest arteries and veins the cells gradually become polygonal in outline.

Gimbert ("Sur la Structure des Arteries," 'Journal de l'Anatomie,' No. 5, p. 536, and No. 6, p. 616, pl. 36—40) calls in question the statements generally made, that with the diminution of their calibre the muscular tunic of the arteries increases in thickness in proportion to the elastic, and that the elastic coats present isolated elastic fibres instead of flat plates. In the aortic arches and in the arteries of the upper extremity the transition from the inner tunic to the middle is effected by a layer of fine elastic fibres, which run for the most part transversely, but partially also longitudinally, and include a few fibre-cells and an amorphous substance. This amorphous substance, which, for no obvious reason, he calls elastic substance, plays an important part in the description of the texture of the aorta and other trunks. It fills up the spaces left in the fenestrated tissue, and invests the individual muscular fibres, and in the arcus volaris it separates the elastic fibres or lamellæ from the muscular fibre-cells.

In the arteries of the lower extremity the tunica interna maintains the same thickness as far as the toes; the gradual diminution of the importance of the middle tunic is visible everywhere except at the angles of division of the vessels, where it quickly and considerably increases in thickness.

In the arteries of the upper extremity the thickness of the middle tunic remains quite unaltered as far as the hand; it sometimes increases, however, in the arteria volaris. The arteries of the neck and face are characterised by rapid thinning of the middle and inner coats. The art. maxill. ext. has the thickest muscular coat, then the temporal, then follow the lingualis, maxillaris interna and occipitalis.

In the arteries of the brain the relative development of the muscular fibre attains its highest grade. The elastic fibres are few in number in the external tunic, and are rarely found in the middle coat.

In the abdominal and pelvic arteries the t. adventitia is of extraordinary thickness. As regards the thickness of the muscular tissue, the following arteries constitute a diminishing series:—Hypogastric, colic, splenic, renal, common pudendal, middle colic, obturator, inferior gluteal, and mesenteric.

The abundance of elastic fibres in the external tunic is proportioned to the quantity of muscular fibres in the inner tunics.

The arteria pulmonalis at its origin contains, in its middle coat, only elastic fibres. At a little distance from the heart fenestrated lamellæ like those of the aorta take their place.

The umbilical arteries have the most abundant muscular bundles at the abdominal ring, where they are arranged both circularly and longitudinally; they diminish outwards from this point in both directions, whilst the elastic fibres of the external and middle tunics diminish from the origin of the umbilical arteries to the navel, and beyond this point those of the external tunic lose themselves in the Wharton fissure, whilst the elastic fibres of the middle tunic completely disappear in the neighbourhood of the placenta.

As regards the vasa vasorum, Gimbert reports that they partly originate from the same artery, and that they form two nets in the tunica adventitia, one external, with wide meshes of an irregular oval or quadrangular

form, and an inner, finer network, the capillaries of which are looped, and even run spirally.

The interesting papers by Dr. Anstie and Dr. Sanderson on the sphygmographic tracings obtained by them in health and disease with Marcy's sphygmograph are too recent ('Lancet,' Dec. 1866) to require notice here, but a passing reference may be made to the instrument employed by Czermak ('Mittheilungen aus dem Privat Laboratorium,' Heft. 1, 1864), which consisted of a photo-sphygmograph, the tracings being obtained from a ray of light reflected from a small mirror placed upon the artery, and received upon a screen of prepared collodion. This instrument possesses the advantage of being extremely light, and at the same time of being easily applied. (A sphygmograph of simple form and easy application is also now being constructed by Mr. Baker, of Holborn.)

From numerous experiments Czermak drew the following principal conclusions:—1. That the rapidity with which the pulse-wave is propagated from the heart towards the arteries is not precisely equal in all parts of the arterial system. 2. That the rapidity of the pulse-wave diminishes in its passage from the centre towards the periphery. 3. That the rapidity of the propagation of the pulse-wave is less in children than in adults.

NERVOUS SYSTEM.

Some important investigations upon the chemistry of the nerves and nervous centres have been prosecuted by O. Liebreich (see Kühne, 'Lehrbuch der Phys. Chemie,' 1866, p. 341), in which he shows that neither cerebrin nor cerebric acid, nor lecithin, nor any of the so-called phosphuretted fats, pre-exist in the brain; but that all these are probably modifications of one substance, which he has called protagon. In order to procure this, the brain-substance is treated with ether and with water, which remove cholesterine and certain soluble compounds; and on the addition of alcohol (85 per cent.) to the remaining mass, at a temperature of 81° Fahr., large quantities of protagon are dissolved out, which are again precipitated on cooling in the form of microscopical acicular crystals, arranged in stellæ. Its composition is empirically represented by the formula $C_{232}H_{240}N_4PO_{44}$. It is soluble in concentrated acetic acid, and is decomposed when exposed to a temperature of 212°. When long boiled with baryta-water it yields an acid—the glycerine-phosphoric, $C_6H_9PO_{12}$ —and a base termed neurin, $C_{10}H_{13}N$, besides certain fatty acids.

The peculiar substance termed by Virchow, myeline substance, and which is somewhat widely distributed in the body, appears to be derivable from protagon. The greater part of the albuminous substance of the brain consists of casein and other compounds that have been found in this part of the nervous system—cholesterine, inosite, lactic, volatile, and uric acids, xanthin, hypoxanthin, kreatin, urea, and leucin. The average amount of water in the human brain is 75 per cent.

The subject which has most attracted the attention of physiologists and microscopists during the past two years in regard to the nerves has undoubtedly been the mode in which they terminate, especially in muscle; some holding with Kölliker and Dr. Lionel Beale that the finest nerve-fibres form loops, lying on the outer side of the sarcolemma of the muscular fibres, whilst others, including most of the German observers,

believe that the nerve-fibres penetrate the sarcolemma and become directly continuous with the muscular substance. It is not likely that both views are correct; yet the different magnifying powers, and the various modes of preparation employed, and the difference which may exist in different animals and in the various parts examined, introduce sources of error that greatly complicate the question, and render it one upon which it is difficult to form a definite opinion.

In Cohnheim's ('Virchow's Archiv,' vol. 34, 1865, p. 194) investigations solutions of nitrate of silver were employed to stain the muscular substance. The muscles of the frog, snake, and lizard were examined, and by careful dissection the nerves could be traced, still retaining their double contour, to near the sarcolemma, where he states that they divide in a forked manner, and then, appearing to penetrate the sarcolemma, lose their double contour, become extremely attenuated, and terminate either, as in the frog, in delicate white lines, of irregular and varying width, running for the most part longitudinally to the muscular fibre, and communicating with one another by transverse lines; or, as in the snake and lizard, in a very irregularly formed and deeply indented plate—the terminal plate. He is convinced the appearances he has seen can only be rightly construed on the view that the termination of the nerve lies under the sarcolemma, and on the surface of the proper muscle or contractile substance.

Kühne, whose observations may almost be said to have begun the controversy, has recently ('Virchow's Archiv,' vol. 34, 1865, p. 412) endeavoured to determine the question by another mode of preparing the muscular fibres, viz., by reducing them to a horny consistence by exposure to cold. He also describes and figures the terminal nerve-plate as lying immediately beneath the sarcolemma, which he believes to be continuous with the nerve-sheath. He describes the processes of the terminal plate in nearly the same terms as those used above by Cohnheim, and can see no limiting membrane between the nerve-tissue and the contractile muscular substance. To some who suggest that the terminal plate is only produced by the effusion of the medullary substance of Schwann from the extremity of the nerve-fibre, he replies that neither the terminal plate nor the contractile substance have the power of reducing perosmic acid (OsO_4), whilst Liebreich has shown that such reduction is easily effected by protagon, which quickly assumes a bluish-black colour under the influence of weak solutions of this acid. Frey ('Das Microscop,' p. 207, 1865) and v. Hessling ('Gewebelehre,' 1865, p. 138) agree with the above-mentioned observers in the position they assign to the terminal nerve-plate, placing it internal to the sarcolemma.

The statements of Dr. Lionel Beale ('Proceedings of Royal Society,' vol. 14, 1865, p. 231), who has bestowed much pains and care upon the solution of this question, and who has employed higher microscopic powers than were at the disposal of the German inquirers, are to the effect that nerves invariably form circuits, and that there are, in truth, no ends at all. He describes the ultimate distribution of the most delicate fibres of the frog's bladder—a tissue eminently favorable for examination of this kind, as having a plexiform arrangement, the finest branches invariably lying on the outside of the sarcolemma of the muscular fibre, and forming in this position wide-meshed networks. He appears to regard the finest

fibrils—which do not exceed 1-50,000th or 1-100,000th of an inch in diameter—as proceeding from the breaking up of the axis cylinder of the double-contoured nerves, which may take place both at the centric extremity and at the periphery; but in no instance does the nerve become continuous with any part of the contractile tissue of muscle, nor is it connected with the nucleus of the muscular fibre, nor with that of any other tissue. Moreover, he considers that the idea of a tubular membrane or sheath being an essential and separate anatomical constituent of every individual dark-bordered fibre must be given up.

The mode in which the nerves distributed to unstriped muscular fibre terminate has been examined by Dr. Klebs ('Virchow's Archiv,' 1865, Bd. 32, p. 168), who describes the dark-contoured nerve-fibres as dipping in amongst the fibres, and after dividing dichotomously ending in a row of extremely fine dots (possibly a moniliform fibre), which are closely applied to the outer surface of each muscular fibre.

Lehmann ('Zeit. f. Wiss. Zool.,' Bd. 14, p. 346, 1864) has described and figured the nervous plexus which he has found in the tunica adventitia of the larger vessels. It is composed of minute ganglia, in which are numerous nuclei, lying in a granular substance. The ganglia give off caudate prolongations, which are continuous with extremely fine pale nerve-fibres that frequently anastomose with one another. At the point where these unite, slight triangular dilatations occur, sometimes containing a nucleus.

In the examinations made by Tomsa ('Wien. Med. Wochens.,' 1865, Bd. 15, p. 53) respecting the mode in which the nerves of the hand terminate, two forms of axis cylinder were observed—one large and cylindrical, passing to the corpuscula tactûs, still surrounded by a thin layer of the white substance of Schwann; the other small and forming polygonal or flattened bands, destitute of the medullary substance, and connected with gangliform terminal organs. The corpuscula tactûs, to which one, two, three, or more nerves run, are composed apparently of cells which are placed more or less obliquely to one another, presenting an imbricated arrangement, and directly connected with the terminal rods of the axis cylinder. The other mode of termination, which resembles a gangliform enlargement of the nerve, is formed by a knotting up and expansion of the axis cylinder in which nuclei are distributed.

Richard Greef's ('Schultze's Archiv f. Microscop. Anat.,' 1865, pp. 101 and 437) observations on the termination of nerves in the lower animals, Tardigrada (Infusoria) and Eolida (Mollusca), show that the nervous ganglia in these animals give off fine pale nerves that expand into granular masses that are closely applied to the outer surface of the muscular fibres, partially embracing them and extending for a considerable distance along them. In each of these granular protoplasmic masses a nucleus is visible. There does not appear to be any proper sarcolemma to the fibres, but their outer portion is somewhat condensed. Such nerves would, therefore, seem to agree in their mode of termination with those above described by Klebs.

H. Hoyer ('Reichert und Dubois Reymond's Archiv,' 1866, pp. 180—195) has traced the ultimate branches of the nerve-fibres of the cornea as far as the free surface. In some instances the axis cylinder ran

up between the flat epithelial cells, and terminated abruptly, either projecting from the anterior elastic lamina or lying in a little groove on its surface, whilst in other instances the nerve-fibres appeared to become continuous with the epithelial cells themselves, though this was not quite so satisfactorily determined.

W. Krause ('Zeits. f. Rat. Med.,' vol. 28, 1866, p. 86), in examining the mode of termination of the nerves in the sexual organs, remarks that the existence of clavate terminations (Endkolben) to the nerves in the clitoris and penis of man and certain mammals has long been recognised. But he has recently found peculiar terminal corpuscles, which, on account of their indubitable function, may be called genital-nerve-corpuscles. The greater part of the sensitive nerve-fibres of the clitoris, after becoming pale terminal fibres, end in these bodies. They lie in the tissue of the mucous membrane close beneath the papillæ. The form of the corpuscles is various—spherical, elliptical, or lenticular, but they all present a mulberry-like appearance on the surface. Usually one or two, rarely three or four, double-contoured nerve-fibres enter each corpuscle. They consist of a very firm sheath of connective tissue (in which are many nuclei) and a soft, firmly granular contained material, and they are consequently in these respects allied to the terminal knobs of nerves and to the tactile papillæ. In the penis (of man) precisely similar structures appear.

The observations of Pflüger (pamphlet on 'The Terminations of the Secretory Nerves of the Salivary Glands,' 1866) on the mode of termination of the nerves distributed to the salivary glands are of great interest, since if corroborated by other observers they furnish evidence that the act of secretion is occasioned by the direct influence of the nerves upon the gland-cells themselves, and not (as most physiologists would probably explain the operation of the nervous system) by modifying the flow of blood through the vessels of the secreting organ. Pflüger, besides giving much interesting information in regard to the structure of the gland, believes he has distinctly traced a connection by means of fine moniliform fibres between the nerves and the nuclei of the secreting cells, the latter giving off a process which penetrates the cell-wall, and is continuous with the subdivisions of the axis cylinder. His observations are essentially confirmatory of those of Reich (see 'Henle und Meissner's Bericht' for 1865), and are in a measure supported by the experiments of V. Wittich ('Virchow's Archiv,' 1866, Bd. 37, p. 93) on the effects of irritating the branches of the sympathetic nerve distributed to the parotid gland, for this observer has shown that the relations of this nerve to the parotid are not the same as in the case of the sub-maxillary gland, and that, so far from being considered as an inhibitor of its secretory functions, it is to be regarded as a direct agent in exalting its activity, and this, not by acting on the blood-vessels and modifying the supply of blood distributed to the gland, but by immediate action on the gland-cells themselves, since the power is exerted when the flow of blood is stopped.

E. Ohl ('Canestrini's Archivio per la Zoologia,' &c., vol. 3, p. 113, 1864) has made numerous experiments on the regeneration of nerve-fibres after their division. He finds the peripheric portions of a cut nerve in a frog long retain their normal, physical, and histological characters, as well as

their physiological properties, remaining excitable even to the fifty-fourth day; afterwards, however, they undergo progressive fatty degeneration from the centre outwards. Soon after section a gelatinous material surrounds the cut extremities, which becomes converted into connective tissue, but union by first intention of the divided fibres never occurs. The margins of the divided neurilemma unite, and the gelatinous material enclosed becomes gradually converted into nerve-substance.

Dr. Guttmann ('Reichert's Archiv,' 1866, p. 134) has furnished additional evidence to that already possessed, to the effect that the central parts of the nervous system are insensible, and do not respond to direct stimulation.

In some interesting lectures delivered at the Royal Institution, Prof. Dubois Reymond ('Proceed. of the Roy. Inst.,' vol. 4, p. 575) exhibited ingenious apparatus of various kinds for determining with accuracy the rapidity with which the nerves act as conductors of impressions. In Helmholtz's experiments the rapidity was estimated at 86.6 feet per second for the frog, and by another method at 89.4 feet, whilst for the human subject it was estimated at about 196.8 feet. In the experiments made by Schelske ('Archiv f. Anatomie,' &c., 1864, p. 151) and by Hirsch ('Moleschott's Untersuch.,' Bd. 9, p. 183) it was calculated to be from 98.4 to 111.5 feet per second; and very recently Dr. Kohlrausch ('Henle und Pfeuffer's Zeits. f. Rat. Med.,' Bd. 28, 1866, p. 190) has determined the rapidity for the human subject to be higher than any of the above estimates, amounting, in fact, to 308.3 feet per second. Dr. Munch has shown that the velocity of conduction increases as the nerve approaches the muscle, and V. Bezold that it is diminished in the electrotonic state.

The performance of reflex operations in general occupies a considerable space of time, as much as ten or twelve times longer than that required for the mere transmission of the impression through the sensory and motor nerves. The period required for a mental operation can even be estimated. The time taken up by such an operation of the brain, for instance, as is required for the person to determine what coloured light is suddenly exhibited to him, amounts to .200 of a second, provided the colours are previously known; but if the colours are not known, as much as .354 of a second is required; the difference, .154 second in the latter instance, being obviously the time spent by the mind in determining the fact. The time required by the subject of the experiment to determine on which side he is touched amounts to .067 second, and the time occupied in receiving and answering a signal through the auditory nerve is .149 second.

Dr. Radcliffe ('Proceed. of the Roy. Soc.,' vol. 15, p. 156) has constructed an instrument, on the principle of a condenser, by means of which he has been enabled to show that electricity endowed with a considerable amount of tension is commonly present on the surface of our bodies, and of nerve and muscle and other tissues, and that the currents made known by the galvanometer, to which so much attention has been paid of late, are *secondary* phenomena, developed accidentally by placing the ends of the coil of the galvanometer so as to include points in which the electricity is different in *degree*. Nay, he observes, it would seem that these currents may in reality be a retarded discharge of statical electricity; for it is a fact that they cannot be detected without a coil of

which the wire is so long and so fine as to be capable of giving sufficient resistance to bridle a discharge into the quieter pace of ordinary currents. Since the time that the brothers Weber made the observation, that on the application of an interrupted current of electricity to the pneumogastric nerves in the neck the movements of the heart suddenly stopped, and the organ remains in a state of diastole or relaxation, two views have been gradually developed, and attempts have been made in every way to corroborate them by their respective adherents, the one seeking to explain the phenomena in a manner consonant with the relations already generally known to subsist between nerve and muscle, the other regarding them as a new order of facts, and endeavouring to establish the existence of a "regulatory" or "inhibitory" system of nerves, whose function is not to originate or convey impulses effecting the contraction of muscle, but, on the contrary, the development and conduction of impulses restraining, controlling, or altogether stopping muscular contraction. Several works and essays have been recently published on both sides of the question, though upon the whole the balance of testimony seems to be in favour of the view of the existence of an inhibitory or regulatory system.

Besides the heart, several other organs appear to be influenced in a similar manner; thus, the splanchnic nerves are believed to contain fibres exerting an inhibitory influence over the movements of the intestine, either by being directly distributed to the muscular fibres or, as Bidder believes, by passing in the first instance to the centre of the co-ordinated intestinal movements, viz., to the sympathetic ganglia of the muscular and intestinal walls; and it is not improbable that a similar influence can be propagated to the muscles forming the walls of vessels and to the iris.

Herzen ('Moleschott's Untersuchungen,' Bd. 9, 1865, p. 423; and pamphlet, Florence, 1864) and Schiff, who have been determined opponents of the theory of inhibitory nerves and influences, have urged that any violent mechanical or chemical irritation of the central parts of the nervous system, as the corpora quadrigemina, the thalami, the spinal cord, or even of the peripheric extremities of the nerves, is followed by a great weakening of the reflex activity throughout the body, and that consequently there is no necessity for the hypothesis of the existence of reflex centra in the brain, such violent injuries being quite capable of acting on the heart through the reflex centres of the sympathetic system contained in its substance. On the other hand, they maintain that very feeble electrical or mechanical irritation of the vagus in the neck causes an increase in the frequency and force of the heart's action, whilst more violent irritation stops the heart simply by exhausting the irritability of the pneumogastric nerve. Schiff's view is often called, in reference to this subject, "the exhaustion theory." Schiff considers that it is to the over-stimulation of the fibres of the accessorius that the stoppage of the heart's action is really due when the vagus is irritated. And Heidenhain has adduced this fact in support of Schiff's view, that if the accessory be torn out by its roots, which can easily be accomplished in rabbits, the excitation of the vagus is no longer followed by its wonted inhibitory effect, whilst its evulsion is followed by increased frequency of the heart's action.

Amongst various methods that have been suggested for the solution of

this intricate question is one which consists in ascertaining whether the pneumogastric nerves are affected in the same way as other nerves by certain poisons, as, for instance, by woorara; for it is argued that if, when an animal has been poisoned with this substance, the vagus loses its power of causing the heart to stop when electrically excited, it may reasonably be placed in the category of ordinary motor nerves; whilst if it be not acted upon, an additional argument is obtained for conceiving that we have here a totally distinct class of nerves and nerve-centres. Unfortunately, the results of experiments, whether owing to different animals having been employed, or to varieties (and it is known that there are several) of the woorara poison having been used, the results are extraordinarily discrepant; and it will be sufficient to state that Bernard ('Leçons sur les Effets de Substances toxique,' 1857, pp. 348, 352, 373), Kölliker ('Virchow's Archiv,' Bd. 10, 11, &c.; and 'Med. Cent. Zeit.,' 1858, No. 58), Heidenhain ('Studien des Physiolog. Instituts zu Breslau,' 1865, p. 109), Funke ('Lehrbuch der Physiologie,' 1863, p. 959), and Goltz ('Virchow's Archiv,' Bd. 26, p. 24), all maintain that after poisoning with woorara the pneumogastrics have entirely lost their inhibitory influence over the heart; whilst Bidder ('Reichert's Archiv,' 1865, p. 337), V. Bezold ('Centralzeit.,' 1858, p. 49), Vulpian ('Gaz. Méd. de Paris,' 1858, No. 27), Meissner ('Zeits. f. Rat. Med.,' Bd. 6, p. 506), Giannuzzi ('Centralblatt. f. Med. Wiss.,' 1864, No. 21), and Nasse, deny in the most explicit terms that any influence is exerted either on the pneumogastric or on the splanchnic nerves, or that any loss of inhibitory power is observable.

Nasse (Otto Nasse, 'Essays on the Physiology of the Movements of the Intestine,' pamphlet, pp. 70, 1866) finds that electrical excitation of the sympathetic cord in its different regions provokes no movements of the intestines, except where the inferior mesenteric plexus is given off, when movements of the rectum and descending colon are excited. Nasse entertains no doubt respecting the inhibitory influence of the splanchnic nerves on the movements of the small intestine. When these nerves were excited by electricity, after the death of the animal by decapitation, in some experiments in which he injected oxygenated blood into the aorta, he found that, unless the movements became very lively indeed, excitation of the splanchnics either completely stopped or exercised a material subduing influence upon them. Hence he considers that the functional activity of the splanchnics is not dependent upon the circulation of the blood nor on their direct action upon the vessels. The duration of the activity of the splanchnics after death is very short, not, perhaps, exceeding ten minutes in rabbits. After this period the movements of the intestine seem to be rather increased in energy when the splanchnics are electrically excited, which he attributes to the existence of proper motor fibres mingled with the inhibitory ones, the activity of which, though concealed during life by the latter, is more persistent after death. Besides the motor and inhibitory he admits also a third kind of fibre in the sympathetic, namely, the purely sensory or centripetally coursing fibres, with which he considers it to be highly endowed.

Nasse also gives an extended account of the action of various poisons

(nicotin, woorara, opium, sulphocyanide of potassium, digitalis, caffen, carbonic acid, &c.) on the movements of the intestines.

Interesting results upon the nerves engaged in the acts of deglutition have been obtained by M. Vulpian ('*Rev. des Cours. Scient.*, t. 3, p. 754), who, in his experiments, divided the carotids, and then rapidly removed the skull-cap and greater part of the cerebral hemispheres in dogs. Each cerebral nerve was then irritated in succession. Excitation of the first six nerves was not followed by any result, but upon pinching the portio dura distinct movements were observed in various muscles of the pharynx and œsophagus, clearly due to the filament of communication between this nerve and the auricular of the pneumogastric. Excitation of the glosso-pharyngeal produced movements throughout the whole length of the œsophagus, but they were reflex; for on section of the nerve irritation of the centric extremity still occasioned them, but none followed irritation of the peripheric extremity. On pinching the fibres of the pneumogastric close to their origin distinct movements occurred; these were both direct and reflex, for on section of one pneumogastric the movements still occurred whether the centric or peripheric extremity was irritated, in the former case acting in a reflex manner through the opposite pneumogastric, in the latter directly on the muscles through its own fibres.

As regards the spinal accessory, it does not appear to act on the muscles accomplishing deglutition, though it was very difficult to arrive at conclusive results by this mode of experimenting. It acts directly on the muscles of the larynx required for the production of voice, and by its lower fibres on the muscles of the shoulder.

Irritation of the hypoglossal occasioned no movements of the œsophagus or pharynx.

When another animal, as the cat, was selected, and another mode of experimenting was adopted to determine the function of the spinal accessory, the fibres of this nerve being torn out by the roots, the œsophagus and stomach exposed, and artificial respiration maintained, the galvanization of the pneumogastric on the same side had no influence on the œsophagus, nor were the movements of the heart stopped, whilst both these effects immediately followed irritation of the uninjured pneumogastric. It thus appeared that in the cat the entire motor power of the pneumogastric is due to the internal or anastomotic branch of the spinal accessory. When similar experiments were made upon the rabbit it could clearly be shown that a certain portion of the motor power of the pneumogastric was derived from the spinal accessory, but that the movements of the œsophageal muscles were far from being exclusively submitted to the operation of this branch. It is obvious, then, that the spinal accessory nerve has different relations in different animals, and no general conclusions can be drawn from experiments performed on one species alone.

An interesting case has been placed on record by M. A. F. Spring, of Luttich ('*Presse Médicale*, 1864, No. 34), tending to corroborate the opinions of those who think that the sensations of temperature, pain, and pressure, are conveyed through separate channels.

Some very excellent observations on the structure of the amphibian

and reptilian retina have been published by Mr. J. W. Hulke, in a separate pamphlet, and he defines the following layers in the retina of these animals:

1. Layer of rods and cones—the bacillary layer or Jacob's membrane.
2. Layer of outer granules.
3. Inter-granule layer.
4. Layer of inner granules, equivalent to Bowman's nummular layer.
5. Granular layer, equivalent to Bowman's grey vesicular matter.
6. Ganglionic layer, equivalent to Müller's nerve-cell layer and to Bowman's caudal nucleated vesicles.
7. Optic-nerve layer.

The 2nd, 3rd, and 4th layers collectively form H. Müller's granule layers. All these layers, except the 1st, are traversed radially by a system of delicate connective-tissue-fibres, the relations of which have been most carefully worked out by Schultze. Mr. Hulke has also ('Proceed. of the Royal Society,' vol. 15, p. 189) published the results of his observations on the fovea centralis of the human retina.

MUSCLE.

The structure of striped muscular tissue has been investigated by Dr. Macnamara ('Med. Times and Gazette,' 1866, p. 526) with high powers (1-50th), and he has found the muscles of the chameleon well adapted for the purpose. After describing the arrangement of the fibres in fasciculi in the usual mode, he observes that every fibre is made up of a bundle of ultimate fibres, each of which is enclosed in a transparent sheath or sarcolemma, and runs continuously from one end of the fibre to the other, so that the length of the ultimate fibre depends upon the length of the muscle.* With regard to the arrangement of the contents of the sarcolemma, he compares it to a ladder of contractile tissue, the steps of the ladder being, however, spiral bands, whereas its side pieces are flat bands, running continuously from one end of the muscle to the other. The horizontal bars connect these perpendicular ones, but, as above stated, are curled upon themselves, like a spiral spring. Between the horizontal bands are open spaces, as is shown by their never becoming stained with carmine.

The apparent object of this disposition of the contractile element in muscular fibre is to allow of the contraction of muscle in length without any great augmentation of bulk, the spaces between the horizontal bars allowing of this, and at the same time the spiral arrangement of the cross bands permitting their elongation and contraction upon themselves without any stretching or pulling of the delicate substance of which they are composed. He regards the perpendicular and horizontal striation seen in ordinary muscle under moderate powers as produced, the former by the line of union of two primitive fibres or from the creasing of the sarcolemma, the latter either by the shadows cast upon the open spaces or by the approximation of two horizontal bars.

Dr. Nicol ('Schmidt's Jahrbücher,' Bd. 132, 1866, p. 148) has, under

* This has, however, been shown by Rollet and many others (see below) not to hold in all instances, the fibres frequently terminating in long muscles by fusiform extremities in the body of the muscle itself.—H. P.

the superintendence of Prof. Krause, been engaged in the determination of the length of muscular fibres. Krause himself had previously ascertained that in the sartorius of man the average length was from one third of an inch to an inch and a half, and stated that they present the same fusiform shape as the fibres of smooth muscular tissue. Dr. Nicol found that in small muscles of the hand the length of the fibres was co-equal with that of the muscle. The length of the fibres in the several muscles of the forearm, upper arm, and shoulder-girdle was, however, constantly less than that of the whole muscle, not exceeding 1-25th to 1 inch. He observed numerous spindle-shaped fibres, but also some with curved, others with rounded, and others, again, with divided extremities.

Nawrocki ('Fresen. Zeitsch. f. Anal. Chemie,' Bd. 4, 2) believes his experiments prove satisfactorily that creatinine is not a constituent of muscle, and that whilst muscles at rest contain about 32 to 34 parts in 1000 of creatine, no increase takes place in the amount of this substance during exertion, nor any conversion of it into creatinine.

From examination of the muscular tissue of the heart Eberth ('Virchow's Archiv,' Bd. 37, 1866, p. 100) has arrived at the conclusion that the striated is, like the smooth muscular fibre, composed of cells, each cell in the case of the fibres of the heart presenting a somewhat oblong form, being often forked at the extremities, and containing one or several nuclei. The divarication of the terminal portions, and the occasional presence of lateral processes give rise to the illusory appearance of anastomosis occurring between the fibres described by Mr. Skey and others.

The strength or contractile power of all muscular tissue is wonderfully great. F. Plateau ("Sur la Force Musculaire des Insectes," in 'Revue Suisse,' v. 25, 1866, p. 87) shows that the common cockchafer can overcome a resistance equal to 14 times and the *Donacia nymphaea* a resistance equal to 42 times its own weight. This is a much greater exertion than can be made by any vertebrate animal; but it must be remembered that, as Bergmann has found, the relation between the motor power of an animal and the mass of its body is unfavorable in proportion to its size, the weight of the body augmenting as the cube, the motor power, measured by the section of the muscles, increasing only as the square. Every muscular contraction, it has long been known, is attended with the development of heat, the amount, according to Heidenhain ('An Essay on the Theory of Muscular Force,' pamphlet, Breslau, 1864), varying a little with the weighting when the fresh muscles of frogs are employed; so that the quantity of work done and of heat generated both increase with increasing weighting of the muscle up to a certain point, beyond which limit the production of heat diminishes, and with still greater weighting the amount of work performed also decreases. Heidenhain further found that with equal excitations applied to the nerve, and with the same weighting of the muscles, providing this does not exceed a certain maximum value, the muscle will develop less heat if it be allowed to *shorten*, and thus to perform work, than if it be prevented from shortening. He is of opinion from this, and other results which he has obtained, that there is, in confirmation of Mayer's law, a conversion of heat into mechanical action in muscle.

The expression "absolute muscle force" was applied by Weber to indicate the weight required to extend a portion of muscle to its original length, when uncontracted and unexcited, that has been made to contract to its greatest possible extent; or we may say that the "absolute muscle force" is represented by the weight which, when appended to a muscle when it is stimulated to the utmost degree, is so heavy as exactly to maintain it at its original length, and to prevent it from contracting. Weber estimated the weight required for a portion of muscle of the diameter of 1 square centimètre to be about 2 lb.; Knorz ('Zeitsch. f. Rat. Med.,' 1865) and Henke, however, have shown that the absolute muscle force is not only much higher than the estimate given by Weber, but that it differs considerably in the muscles of the arm and leg, being much greater in the former. From calculations deduced from experiments made on several persons, they find that the absolute muscle force per square centimètre amounts to nearly 13 lb. for the muscles of the leg, and to about 17 lb. for those of the arm.

Ranke ('Tetanus regarded from a Physiological point of View,' Leipzig, 1865) has examined and compared the relative conducting power of dead and living muscle for electricity, and has found that the death of muscular fibre, or even its extreme exhaustion by tetanus, is accompanied by a remarkable increase of its conducting power. Thus, in the dead muscles of frogs the resistance to the passage of a galvanic current is only about one half of that offered by their living muscles, and in mammals only about two thirds. The increased conductivity of the muscle is, in all probability, occasioned by the presence of good conducting products of disintegration, amongst which the acids are the most important. In like manner, boiling the muscle, by increasing the proportion of secondary products which conduct electricity well, and by decreasing the amount of true and healthy muscular fibre which conducts electricity badly, diminishes the resistance offered by muscle by at least one fourth of its original amount. It is remarkable, however, that the resistance to the passage of electrical currents in other tissues, such as the nerves, tendons, and cartilages, is not materially different in the dead from the living. The living muscle of the frog conducts electricity about 3,000,000 times worse than mercury and about 115,000,000 times worse than copper. As regards the chemical changes effected in muscle by tetanus, Ranke finds that, if the circulation be maintained, the per-centage of water increases about 2 per cent., at the expense of the solids. He has also noticed that the muscles of frogs contain a small amount (.058 per cent.) of a sugar capable of undergoing fermentation, and that after tetanus this increased to about half as much again (.093 per cent.). In rigor mortis the amount of fat increases, whilst the albumen diminishes. Ranke's experiments further seem to show that there is a direct loss of the substance of the muscle in the act of contraction, since as much as 10.6 per cent. of the watery extractives of the muscles of a frog disappeared after tetanus.

The presence of blood is not requisite for the act of contraction; the muscular tissue *per se* contains all the conditions requisite for contraction, yet muscle containing blood can do more work than anæmic muscle. It is clear, therefore, that the muscle can apply materials contained in the blood to the purpose of mechanical work.

In regard to muscular contractility, Mr. N. F. Baxter ('Beale's Archives,' vol. 4, p. 203) has furnished a suggestive paper, tending to show that the act of contraction is due to the molecular attraction of the particles which constitute the muscle, and that during life and in the ordinary condition of elongation or relaxation these particles are in a polarized state and self-repellent, requiring for the exertion of any force a depolarizing agency, which is usually exerted through and by the nervous system; and that when depolarization of the particles has occurred, as in the act of muscular contraction, the polarized state can be easily and readily restored by the act of nutrition.

The dominant opinions regarding the nature of the chemical changes which take place in muscular fibre during the period of contraction, and the kind of alimentation required to repair the loss, have been shaken by late researches, and appear to require considerable modification.

The view that was formerly generally entertained, and which at first sight seems unassailable, was that in the act of contraction muscles destroy or use up a portion of their substance; hence during violent exertion there is a constant demand for food over and above that which is occasioned by the changes that are natural to all living and organized tissues exposed to the action of warmth, moisture, and oxygen. But it is well established that the essential constituent of muscle is a substance belonging to the albuminous group; the oleaginous and farinaceous (glycogen) and mineral substances forming comparatively a very small proportion of the entire mass. It was perfectly natural, therefore, to suppose that muscular exertion would be attended by the appearance of the products of the disintegration of albuminous substances, such as urea, uric acid, &c., in the excretions, and that an increased supply of albuminous compounds would be required as food to supply the waste. (See Dr. Lyon Playfair's lecture 'On the Food of Man in relation to his useful Work,' pamphlet, Edin., 1865, where this view is powerfully sustained.) The results of chemical investigation seemed to favour these views, and it was very confidently stated that the quantity of urea discharged in the urine was considerably increased after exertion. But the observations and experiments of Dr. Edward Smith and others have shown that, first, there is no marked increase in the amount of urea and uric acid contained in the urine, and that there does not appear to be any accumulation of these substances in the muscles, even after very violent and prolonged exertion; and further (see Messrs. O. B. Lawes and J. H. Gilbert, 'Lond., Edin., and Dub. Phil. Mag.,' vol. 32, 1866, p. 62), that whenever very violent exertion is undertaken there is a constantly increased demand for *non-nitrogenous* food. Moreover, an unexpected result was obtained, viz., that all muscular exertion is attended with an increased excretion of carbonic acid by the lungs, whilst one of the chief products of disintegration contained in the muscle, viz., lactic acid, certainly belongs to the saccharine type.

A modification of the old view came, therefore, to be held, namely, that the albuminous substance in muscle, though constituting the contractile agent, is yet, so to speak, only the field on which the chemical changes, consisting in the oxygenation of fatty and saccharine materials, take place. Hence a supply of these materials in the food, especially during vigorous exertion, becomes absolutely requisite.

A theoretical exposition of the facts nearly in accordance with these views has been promulgated by the Munich school, the chief points of which have been well summed up by M. Sée in the following terms (see his lectures in the '*Revue des Cours Scientifiques*,' 1866, Nos. 35, 38, 40, &c.):—Muscular exertion uses up neither the proper substance of which muscular tissue is composed nor the albuminous substances consumed as food; it produces only such molecular changes in myosin and musculin that they become transformed into retrogressive compounds like creatine, creatinine, sarkin, and uric acid. But the decomposition is arrested at these primary derivations, and does not progress to the formation of urea, which is the last result of the disintegration of the albuminous constituents, and which consequently, under these circumstances, neither accumulates in the muscle nor is eliminated in excessive quantity by the kidneys. Besides these azotized substances, however, sugar and lactic acid are either obtained from the food or are produced at the expense of the musculin; these undergo further decomposition, favoured by the presence of the albuminous compounds; hence follows the production of the excess of carbonic acid, now known to take place as the result of muscular exertion. Hence, therefore, it would appear that both the albuminous and hydro-carbonaceous materials entering into the composition of muscle are used up in the production of contractile force. Fatigue, as Ranke has shown, is in reality due to the accumulation of the products of disintegration, and notably of the lactic acid in the muscle. As soon as this is removed by the blood- and lymph-currents the muscle is again fit for exertion, and the further conclusion is obvious, that, as both the nitrogenous and the non-nitrogenous constituents of the muscle are employed in the acts of contraction, it is necessary for both of these groups to enter into the ordinary diet of healthy adults, who are desirous of maintaining their power in full energy and activity.

Fick and Wislicenus, however ('*Lond., Ed., and Dub. Phil. Mag.*,' vol. 31, p. 485), performed an experiment which they believe goes far to prove that in sustained muscular exertion it is the hydro-carbonaceous or non-nitrogenous substances which, by their combustion, supply the requisite energy, and that the consumption of the nitrogenous or albuminoid compound is not materially augmented.

They climbed the Faulhorn, rested a night at the summit, and then descended. For 31 hours previously they took no nitrogenous food, and only a moderate quantity of non-nitrogenous food. The amount of urea eliminated, both during and for a certain period after the ascent, was carefully estimated, and they attempt to show that the amount of albumen consumed represented by this urea was in no wise sufficient, when burnt, to furnish the amount of energy requisite for the severe and persistent exertion required. Though the data in their possession were inadequate for the solution of this question, the argument was very ingeniously sustained. The subject was soon after taken up by Prof. Ed. Frankland ('*Proceed. of the Royal Institution*,' 1866, p. 661), who showed that, as they also were well aware, the point in which the experiment of MM. Fick and Wislicenus had failed was that they were unacquainted with the quantity of heat generated when muscle is burnt to the products in which its constituent elements leave the human body through the lungs

and kidneys. This hiatus was supplied by Prof. Frankland himself, who made a calorimetric determination of the actual energy evolved by the combustion of muscle and of urea in oxygen, and then proceeded to the consideration of the problem to be solved, which may be thus summed up:—It is agreed on all hands, Dr. Frankland remarks, that muscular power is derived exclusively from the mutual chemical action of the food and atmospheric oxygen; but opinions differ as to whether that food must first be converted into the actual organized substance of the muscle before its oxidation can give rise to mechanical force, or whether it is not also possible that muscular work may be derived from the oxidation of the food which has only arrived at the condition of blood, and not of organized tissue. To determine this fundamental point the following data require to be determined:—1. The amount of force or actual energy generated by the oxidation of a given amount of muscle in the body. 2. The amount of mechanical force exerted by the muscles of the body during a given time. 3. The quantity of muscle oxidizing in the body in the same time. Prof. Frankland performed a series of experiments, having the solution of these questions in view, and arrived at the following conclusions, which may be considered as giving the most scientific exposition of the facts hitherto advanced. He considers—1. That muscle is a machine for the conversion of potential energy into mechanical force. 2. That the mechanical force of the muscles is derived chiefly, if not entirely, from an oxidation of matters contained in the blood, and not from the oxidation of the muscles themselves. 3. That in man the chief materials used for the production of muscular force are non-nitrogenous, but nitrogenous matters can also be employed for the same purpose, and hence the greatly increased evolution of nitrogen under the influence of a flesh diet, even with no increase of muscular exertion. 4. Like every other part of the body, the muscles are constantly being renewed; but this renewal is not perceptibly more rapid during great muscular activity than during comparative quiescence. 5. After the supply of sufficient albuminoid matters in the food of man to provide for the necessary renewal of the tissues, the best materials for the production both of external and of internal work are non-nitrogenous matters, such as oil, fat, sugar, starch, gum, &c. 6. The non-nitrogenous matters of food which find their way into the blood yield up all their potential energy as actual energy; the nitrogenous matters, on the other hand, leave the body with a portion (one seventh) of their potential energy unexpended. 7. The transformation of potential energy into muscular power is necessarily accompanied by the production of heat within the body, even when the muscular power is exerted externally. This is, doubtless, the chief and probably the only source of animal heat.

The condition of the muscles in rigor mortis has been the subject of numerous experiments by Dr. Norris ('*Journal of Anat. and Physiol.*, Humphry and Turner, vol. 1, p. 114, 1866), who has arrived at the conviction that rigor mortis is not an affection of the vital property of irritability in muscles, and therefore cannot be regarded as vital contraction; but, on the contrary, that it is some peculiar alteration in muscular tissue, such as may result from the coagulation of the inter-

fibrillar juices (Brücke and Kühne), which, so long as it is present, suspends or interferes with the properties of elasticity and extensibility in muscle.

M. Preyer ('Travaux de la Soc. Méd. Allemande,' Paris, 1865, p. 37; and 'Canstatt's Bericht,' 1865, p. 153) has recently reinvestigated the possibility of restoring the vital properties of muscles which have passed into the condition of rigor mortis. He corroborates the statements of Kühne, that muscular tissue in this condition may have its original appearance restored, may lose its acid reaction, and may regain its extensibility if it be injected with weak solutions of common salt, of nitrate or of carbonate of soda, which probably act by dissolving the myelin or coagulable constituent of muscle; but, on the other hand, the muscles never regain their irritability. Immersion in distilled water soon induces rigidity of the muscles of frogs, and even in living frogs the same effect can be produced by tying a firm ligature round a limb and immersing it for six or seven hours in water, when the rigidity will be observed to be accompanied by considerable swelling. If, however, when the muscles have thus become rigid, the limb is immersed in a 10 per cent. solution of common salt, the swelling diminishes, the muscles recover their usual appearance, and if, by the removal of the ligature, the passage of blood is no longer impeded, they soon regain their irritability.

The application of a high temperature, as of 113° Fahr., or higher, produces the most complete coagulation and the firmest rigor mortis; but even then excitability and electric currents of the muscle may be reproduced on treatment with solutions of common salt and free admission of blood through the vessels. A condition analogous to or identical with rigor mortis can also be induced by the action of chloroform. In all these instances Preyer thinks that the irritability and electrical properties of the muscles can be regained, providing they are not rendered completely rigid, by the simple admission and free passage of the blood through them. On the other hand, if they are rendered completely rigid, these vital properties can only be regained by the combined action of solutions of common salt and of renewed currents of blood. It is remarkable that such restored muscles are sooner amenable to the action of the will than they are to the most energetic external stimuli. He entertains no doubt but that the rigidity of the muscles is due to a coagulation of some of their constituents, which, when it passes beyond a certain point, causes them to lose their irritability. Exhaustion proceeds from inferior degrees or grades of the coagulation of these substances.

As regards the development of striated muscular fibre, Dr. Wilson Fox ('Phil. Trans.,' 1866, p. 101) has contributed the following observations made with high powers (1-25) on tadpoles—which he has found well adapted for examination—chicks, and sheep.

He considers that the earliest forms which indicate any differentiation from the round cells of the embryo are oval bodies of about 1-500th to 1-800th of an inch in length, containing a clear oval nucleus, with much black pigment matter and glistening scales, and which, when kept for some time in glycerine, present a distinct cell-

membrane around considerable portions of their outline, though this is not very evident in fresh specimens.

These primary muscle-cells elongate, their nuclei frequently multiply, and the contents divide into a clear peripheral and a darker, granular, central portion; the former undergoes both transverse and longitudinal striation, and the latter contains the nucleus, whilst the whole is bounded by a membrane which he regards as the sarcolemma. From this account it would appear that each fibre is to be viewed, not as Kölliker considered it to be, a single many nucleated cell, but as a structure representing a series of many potential cells, which have, however, never separated, their division after the multiplication of their nuclei being prevented by the fibrillation longitudinally (as shown by striation) of a portion of their contents, while the sarcolemma would thus represent the united membranes of many cells which have been engaged in the formation of the fibre.

In an interesting paper on the development of fat M. F. Czajewicz ('Reichert und Dubois Reymond's Archiv,' 1866, Heft 3, p. 289) observes that in good specimens the several cells are almost always separated from one another by fine lamellæ of connective tissue. They consist of a doubly contoured membrane, finely granular oily contents, a nucleus, and nucleoli. The cells take origin in the cells of connective tissue, and it may be clearly seen how the small, delicate, flattened, finely granular connective-tissue-corpuscles increase in size, assume a spherical form, and gradually become filled with a mist of small fat-drops, which ultimately blend into one great round drop. When an animal is starved the oily substance is withdrawn from the cells, which become filled with serum, still preserving the round form. If now abundant food be given, the cells again become filled, first with a fatty mist, and then with drops which coalesce. If inflammation be set up in adipose tissue by the injection of iodine solution, the endogenous formation of cells can be distinctly seen.

It was formerly held by Liebig, Milne-Edwards, Dumas, and others, from experiments made on herbivora, pigs, geese, ducks, and bees, that the fat of the body was derived in great part from the carbo-hydrates of their food, but that it might also be produced from the nitrogenous compounds. In 1864 Dr. Hayden, of Dublin, at the Bath meeting of the British Association, argued from physiological considerations that fat was not producible in the body from sugar and allied substances, but that both were oxidized, ministering to animal heat. In 1865 Voit maintained, from the results of experiments with dogs fed with flesh, that their fat must have been produced from the nitrogenous constituents of the food, and that these were probably the chief, if not the only, source of the fat even of herbivora. He relied chiefly on the formation of adipocere from nitrogenous substance; but particularly that in experiments made by Pettenkofer and himself, in which large quantities of flesh was given to a dog, the whole of the nitrogen reappeared in the urea and fæces, whilst only a portion of the carbon was recovered in the urine, fæces, and the products of respiration and perspiration, from which it was concluded that some had remained in the body and had contributed to

the formation of fat. That animals do not become fat when fed upon very highly nitrogenous food, Voit considers sufficiently explained by the greater number of blood-corpuscles the result of such diet, and the greatly increased activity of oxidation of nitrogenous substances under such conditions; whilst, on the other hand, the accumulation of fat, when fat and carbo-hydrates are supplemented to a liberal nitrogenous diet, he considered to be connected with the much less active oxidation of the nitrogenous substance and fatty matter that then takes place, rather than attributable to the direct production of fat from the carbo-hydrates.

Mr. J. B. Lawes and Dr. Gilbert ('Lond., Edin., and Dub. Journ.,' Dec. 1866, p. 439), from whom the above remarks have been extracted, have again returned to their subject, and made careful experiments on pigs, and have arrived at the following conclusions:—1. That certainly a large proportion of the fat of the herbivora fattened for human food must be derived from other substances than fatty matter in the food. 2. That when fattening animals are fed upon their most appropriate food, much of their stored up fat must be produced from the carbo-hydrates it supplies. 3. That nitrogenous substances may also serve as a source of fat, more especially when it is in excess and the supply of available non-nitrogenous constituents is relatively small.

Waldeyer's observations on the development of bone show that the contents of the primary medullary spaces formed in the cartilage consist of the granular *débris* of the cartilaginous matrix, and of a number of young cells proceeding from the cartilage-cells. The young cells may be divided into two groups—one aiding in the formation of the osseous tissue, the other developing into medullary tissue. Those which produce osseous tissue are termed "*osteoblasts*," and consist of masses of granular protoplasm, apparently destitute of an investing membrane, but containing a nucleus, which arrange themselves side by side, almost like an epithelial layer, on the inner surface of the primary areolæ of bone-substance. The first trace of a bony deposit appears as a slightly yellowish but homogeneous edging to the cartilaginous trabeculæ; lower down the osteoblasts may be seen half buried in bony deposit, and here and there communicating with others not enclosed, by long processes. The osteoblasts present an elongated or tailed appearance, and their peripheric portion blends with the osseous substance without there being any well-marked line of demarcation between them. After the first set, which proceed directly from the cartilage-cells, have been used up, fresh osteoblasts are developed from the cells of the young medullary tissue. The young medullary tissue has a different structure from the subsequent yellow and red marrow of the bones. It belongs to the group of embryonal connective-tissue substances, and is composed of fusiform or stellate cells, connected together by their prolongations, the protoplasm of which, especially near the blood-vessels, early becomes delicately fibrillated and soaked with an albuminous fluid. It gradually develops in three directions—1, towards ordinary adipose tissue; 2, towards red medullary substance; and 3, towards osseous tissue, the last being accomplished by the production and laminated deposit of epithelial-like osteoblasts. Waldeyer believes that some of the osteo-

lasts become *wholly* converted into bone, in which case the nuclei vanish, whilst others only become partially converted into bone by the peripheral portion of their protoplasm, the central portion remaining with the nuclei as bone-lacunæ. The mode of ossification of periosteal structures, or intramembranous ossification, he believes to be essentially similar.

The excellent description of the development of bone by Prof. Sharpey, in the last edition of Quain and Sharpey's 'Anatomy,' and which agrees in almost every point with the foregoing, is easily accessible to every reader.

Prof. Huxley ("Beale's Lectures," vol. 1 of 'Archives of Dentistry,' p. 246) admits that teeth are homologous with hairs, but he thinks that both these organs are dermic, and not in any part epidermic. He thinks that all the dental tissues are produced beneath a *membrana præformativa*, and considers that the enamel is developed not *upon* but *beneath* basement membrane. He thinks that scales and feathers may come into the same category, but would admit nails to be purely epidermic. In an accurate translation of that portion of Henle's great work on anatomy which treats of the teeth, by Dr. Cayley ('Archives of Dentistry,' vol. 1), it will be found that this observer also maintains the existence of a *membrana præformativa*, but states that the ossification proceeds from this membrane, from without inwards in the pulp, to form the dentine, and from within outwards, as far as the enamel-pulp, to form the enamel; he therefore regards the enamel as being an epidermic tissue, and the dentine as of dermic origin. Waldeyer ("Researches on the Development of the Teeth," 'Zeit. f. Rat. Med.,' vol. 24, p. 169) gives the following as the result of his observations:

The matrix of the dentine is composed of cells—the dental cells—which are analogous to the osteoblasts of ossifying cartilage, and develop on the surface of the dental pulp by multiplication and enlargement of its cells. Waldeyer does not admit a *membrana præformativa* or structureless membrane covering these cells. The cells are irregularly prismatic or roundish bodies, whose inner extremity is somewhat thicker than the outer, and is provided with three or four processes; some small processes are also given off from the sides of the cells, giving them a toothed appearance. He compares these dental cells, with their prolongations, to bone-cells. In the fresh state no cell-membrane is distinguishable. The formation of dentine consists in the conversion of a peripheric portion of the protoplasm of these cells into gelatine-yielding substance, with subsequent impregnation of the latter with lime, whereby the central part of the protoplasm in the form of soft fibres, named *dental fibres*, remains behind, whilst the uncalcified lateral processes of the cells form the anastomoses of the dental fibres and dental canaliculi. As regards the dental sheath, that is, the layer which immediately invests the dental fibres, and is differentiated from the remaining intertubular substance, he believes that it originates from the innermost layer of the gelatine-yielding substance, which, instead of calcifying, becomes converted into elastic tissue. The interglobular spaces, so called, are formed by the process of calcification taking place in the dental pulp, and preceding the regular

deposit and formation of dentinal cells, and the spaces include heaps of cells, which in dry sections become filled with air.

With several of these statements Dr. Beale's ('Archives of Dentistry,' vol. 1) investigations concur. He regards it as certain that no preformative membrane has been actually demonstrated over the enamel, as Huxley asserts, though the appearance of one can be easily obtained by the action of acids. It is certain, also, he states, that no such membrane exists between the enamel and the dentine, for in many instances the latter tissue actually extends into the former, as was first shown by Mr. Tomes; nor, finally, is there any between the dentine and the pulp of the tooth, since these tissues run into one another. From his observations he is disposed to regard both the enamel and the dentine as being in reality *epidermic*, and not, as Mr. Huxley holds, *dermic* structures. Dr. Beale also describes and figures the so-called tubuli of the dentine as being naturally filled with a solid rod or fibre.

In a short but interesting essay in the 'Archives of Dentistry' (vol. 1, p. 281) Mr. S. James A. Salter disputes the statements of Tomes and Beale to the effect that the well-known dental tubes are solid fibrils, and not, as generally admitted, tubes for the conveyance of nutritive material. Mr. Salter remarks that they may be brought very distinctly into view by acting on recent or old, or even fossil teeth, with concentrated pure muriatic acid, and adduces various reasons for continuing to regard them as tubes. These are lined for a short distance, at least, from the pulp-cavity, into which they open by a membranous tube, that can be withdrawn in short lengths, but at no great distance from the pulp. Mr. Salter believes that these membranous tubes receive, in common with the intertubular substance a calcific impregnation. He considers that they are plasm-tubes; that their connection with the nervous system, if any, is secondary; that the brilliant rings seen in transverse sections of dentine are an optical illusion; that the apparent calcareous canal, thrice the diameter of its hollow, has no real existence; and that the rings in question, comparatively large, are caused by the light-refraction of the thin walls of the membranous tubes, which are so much smaller in diameter.

A most interesting paper is contained in the same volume, by A. Mitscherlich, giving an account of numerous successful cases of the replantation and transplantation of teeth, showing that in young persons a firm graft of the new tooth introduced may be obtained.

Irminger and Frey ('Kölliker's Zeits.,' 1866, p. 208) have made careful injections of the ducts of the liver, for which they find those of the rabbit best adapted. According to their observations the ducts terminate in a plexus within the lobules, the vessels constituting which possess proper walls, and enclose the hepatic cells, not in their interior, but in the interstices of their meshes.

Michael Tscherinoff ("On the Dependency of the amount of Glycogene contained in the Liver on the Food," 'Moleschott's Untersuchungen,' Bd. 10, 2, 223) fed a series of fowls for a certain time on various foods, and then determined the relative quantity of liver glycogene. He agrees with Pavy in believing that there is little or no sugar in the liver in life, though the conversion of the glycogene substance into

sugar takes place rapidly after death. Feeding the animals with sugar, and with food containing much hydrocarbonaceous matter, he found greatly increases the proportion of fat and glycogene substance in the liver, not by the absolute *conversion of the sugar ingested into glycogene*, which is chemically difficult to understand; but in consequence of the sugar ingested being destroyed in the blood, there is a "*sparing*" of other easily oxidizable materials, and hence a storing up of fat and glycogene in the liver; whilst the opposite occurs when an insufficiency of carbo-hydrates is given.

Dr. Robert McDonnell ('Observations on the Functions of the Liver,' pamphlet, Dublin, 1865) has proposed another theory of the origin of the glycogene substance of the liver, maintaining that since the blood which enters the liver is rich in fibrine and albumen, whilst that which leaves it is poor in these materials, a breaking up of them takes place into secondary hydrocarbonaceous compounds, which are partly eliminated by the bile-ducts and are partly stored up as glycogene; and into nitrogenous compounds, which reunite with the hydrocarbonaceous amyloid substance, and leave the liver as a newly formed proteic compound, partly, perhaps, as globuline and partly as a material resembling caseine or albuminose.

Michael Foster ('Proceedings of the Royal Society,' No. 79, 1865) has found glycogene in the tissues of the round worm (*Ascaris lumbricoides*).

F. Grohe ('Virchow's Archiv,' Bd. 32, Heft 4, p. 401, Taf 11, figs. 1—7) has paid much attention to the movements of the spermatozoa, which he believes to be effected by a contractile substance, especially abundant in the head of the animaculae, and which is invested by a structureless membrane. He believes that, on contraction taking place in the head, a corresponding enlargement takes place near the root of the tail, which may even exceed the head in size. He thinks the structureless membrane and the contents may best be distinguished by the action of aniline, which colours the latter of a deep red tint.

Schweigger-Siedel ('Schultze's Archiv,' Bd. 1, 4, 309) and Lavalette St. George (ibid., p. 403) deny the existence of the movements above described; and Bizzozero ('Annali Universali,' vol. 187), who has found the spermatozoa to behave exactly like ciliated cells when exposed to various reagents, thinks the movements are essentially effected by the tail.

Henle ('Anatomie des Menschen,' p. 357) observes that, whilst the spermatozoa retain their vitality even in extreme old age, they are frequently absent in the seminal fluid of those suffering under disease. This observation has been supported by Mantegazza and Bozzi in 88 cases of various forms of disease. On examination of the testes the spermatozoa were found to be deficient in both in 12 cases, and in one testes in 9; whilst this could only be referred to degeneration of the testes in 2 cases.

Schweigger-Siedel ('Max Schultze's Archiv f. Microscop. Anat.,' Bd. 1, p. 309) believes that he has been able to follow the development of the seminal animalcules, and can state definitely that they do not proceed, as Kölliker maintains, from the nuclei of cells, but that they

correspond to an entire cell; that they are, in fact, modified ciliated epithelium-cells with a single cilium. The head of the animalculæ, which presents many different forms in the semen of different animals, always contains the nucleus.

A few years ago a very remarkable paper on the structure of the kidney was published by Henle, in the 'Gottingen Archives,' in which he endeavoured to show that there were two distinct systems of tubes in the kidneys—one commencing by a plexus in the cortical portion of the kidney and terminating by open mouths on the pyramids, the other consisting of looped tubuli closed at the extremities, both of which were bulbous, and, in fact, formed the Malpighian capsules, the loop ascending for a considerable distance in the pyramids. The novelty of the observations, and the authority of their expounder, led to much research upon the subject, the end of which has been that the original observations of Mr. Bowman have remained intact, the only addition made to them being that the tubuli in their passage from the Malpighian capsules do really form remarkable loops which enter the Malpighian pyramids. The following remarks by Hertz ('Greifswalder Medicin Bericht,' Bd. 3, Heft 2, p. 93) will, without the aid of a diagram, render the course of the tubuli perfectly intelligible. He observes that from the Malpighian capsules spring tortuous canals having a narrow neck. These are lined by a dark granular epithelium, the several cells of which are not very well defined from one another. Entering the periphery of the pyramids, they pursue a straight or slightly wavy course, and, becoming much attenuated, form loops, either in the cortical substance or in the upper middle or even lower third of the pyramids. From thence they return to the cortex, emerging from the pyramids by easy curves, and finally enter the larger collecting tubes which run in a nearly straight direction to the apices of the pyramids.

Michael Ssubotin ("Essay on the Urinary Secretion," 'Henle und Meissner's Zeits. f. Rat. Med.,' Bd. 28, 1866, p. 114) observes that it was formerly believed that the kidney formed the urine, as the liver the bile; but many chemical researches have led to the conviction, generally entertained, that the kidneys only separate already prepared substances from the blood, and exercise no influence on their origination. But we must allow that a portion of the urinary constituents are formed in the substance of the kidneys, as they are in all other organs in which metamorphosis of tissue is taking place, especially, moreover, since Cloetta has shown that the lower grades of the process of oxidation are present, as taurin, cystin, hypoxanthin, which are not found in the urine, and therefore, probably, are converted into urea by the action of the renal epithelium. Oppler has found ("Beiträg zur Lehre der Urämie," 'Virchow's Archiv,' Bd. 21, p. 260) that more urea is present in the blood after ligature of the ureter than after extirpation of the kidneys, whilst, on the other hand, the quantity of kreatin in the muscles was greater in the latter than in the former case. And Zalesky ('Untersuch. über den Urämischen Process,' &c., Tübingen, 1865), from many experiments made on dogs, birds, and reptiles, has ascertained that, though traces of urea and uric acid are



found in the spleen, brain, and other organs, yet that the largest proportion is formed in the kidneys themselves. From experiments which he has himself undertaken he has framed the following conclusions:

1. That in the renal parenchyma under normal conditions only a small quantity of urea is present.

2. That heat develops in the kidneys, and in their watery extract, not urea, but extractive substances, which form insoluble combinations with nitrate of silver.

3. The watery extract of the kidneys, at the temperature of the body, converts a portion of the kreatin into urea.

4. The renal parenchyma possesses this power in a high degree.

Schunck ('Proceed. of the Royal Soc.,' vol. 15, No. 80, p. 1) concludes from his observations that human urine contains, at least, two peculiar and distinct colouring matters, one of which is soluble in alcohol and ether, while the other is soluble in alcohol, but not in ether. The former has a composition represented by $C_{86}H_{51}NO_{52}$, the latter by $C_{38}H_{27}NO_{28}$.

Dr. Moore ('Med. Times and Gaz.,' 1866, vol. 2, p. 525) has published a case in which he satisfactorily determined the presence of casein in the urine. The secretion had previously been albuminous; it presented an alkaline reaction, possessed a sp. gr. of 1.015, no longer coagulated on the addition of nitric acid after the application of heat, but coagulated on addition of acetic acid, and on evaporation covered itself rapidly from time to time with a caseous pellicle. It contained little urea, but deposited numerous blood-corpuscles, some mucus and oil-globules, and a few spermatozoa. This case is an interesting one in a physiological point of view, since, as Dr. Moore observes, it was evident, from the large number of blood-corpuscles contained in the deposit, that much blood was present in the urine, while no albumen, but much casein, was found in the latter; and it would, therefore, appear as if the albumen of the blood itself had, in the short space of 24 hours, undergone an extensive caseinuous modification, unless, indeed, we admit that some substance had been secreted, or some decomposition had taken place in the fluid, by which the ordinary reactions of albumen were masked or made to simulate those of casein.

MM. Estor and C. St. Pierre (Robin's 'Journal d'Anatomie,' 1865, p. 190) are of opinion that the functional activity of the spleen alternates with that of the stomach.

There has been some controversy during the past year between M. Phillippeaux and M. Peyrani in regard to the possibility of the regeneration of the spleen after its ablation, and the question may be considered as still in abeyance; but there can be no doubt that the spleen may be removed from the body, as in M. Phillippeaux's experiments, and may yet recover or preserve, if immediately replaced, its normal characters; and even when it has not been replaced it is possible that the reappearance of the organ noted by the same observer may be due to the growth and development of the little splenculi so frequently seen in its vicinity.

REPORT ON PRACTICAL MEDICINE.

BY

FRANCIS EDMUND ANSTIE, M.D., F.R.C.P.

A. DISEASES AFFECTING THE GENERAL SYSTEM.

Relapsing Fever.

IN the end of 1864 and beginning of 1865 this disease made its appearance at St. Petersburg, and at first occasioned great alarm, from its features not being recognised, and an apprehension having arisen that it was the Oriental plague. Inquiry soon showed, however, that it was, in fact, the disease well known, more especially in Great Britain, as relapsing fever, the "starvation-fever" of the times of Irish distress; and the circumstances of its origin in Russia were proved to correspond with this character. The papers below cited will sufficiently establish its identity with the disease as known in this country.

A note from Dr. Tillner,* communicated by Dr. Galligo to the Academy of Medicine on April 4, 1865, says that the fever then prevailing in St. Petersburg presented strong analogies with that first shown in Scotland in 1819, and denominated relapsing fever. The attack commenced with rigors, followed by great heat, the thermometer rising to 104° to 106° Fahr. The pulse rose to 130; the functions of the nervous system were weakened and disordered, but the mental powers were preserved. Headache and *courbature* were often present. The left hypochondriac region was very painful, and there was very marked enlargement of the spleen. The skin was of a yellow colour. The first paroxysm was prolonged to the seventh or eighth day, and was terminated by profuse sweating. After an interval of seven or eight days, during which there was apparent recovery, a similar paroxysm would occur, attended with greater prostration; and sometimes, after another seven days, a third paroxysm. There was always much thirst, and complete anorexia; also great prostration, and severe disorder of the intestinal canal. The mortality was 8 per cent. Death generally occurred during the second attack, and was preceded by symptoms of general paralysis, much disorder of the nervous system, decomposition of the blood, engorgement of the spleen and liver, and congestion of the abdominal veins; but without any trace of the intestinal affections

* 'Gaz. Méd.,' xiv, 1865.

attending typhoid fever. The principal lesion was, therefore, very marked hypertrophy, with some softening of the spleen, which was of a black patchy colour. The blood was found on chemical analysis to be deficient in red corpuscles and fibrin. In the treatment quinine was ineffectual, either in small or in large doses; and stimulants were of no avail in the stage of prostration. The disease was attributed to the immigration into St. Petersburg of a large number of labourers, who inhabited unhealthy dwellings, and used as food bread containing a large proportion of ergot.

Doubowitski ('A Report made to the English Ambassador at St. Petersburg by the Russian Government')* gives details on several points regarding the epidemic. The disease was described as being relapsing fever. It occurred for the first time at St. Petersburg in 1864-65, but had previously, in 1840, prevailed in a severe form at Moscow, and in 1858 at Novo-Archangelsk, in American Russia. At the date of the report the relapsing fever was prevalent in various districts of the governments of St. Petersburg and Novgorod, especially in the line of railway. Petechial typhus, however, was more frequently met with in the last-named government, and in those of Penza, Tauris, and Kharkow; while in several other governments there was a moderate amount of typhoid. The relapsing fever was declared to be contagious; several medical men and attendants on the sick had been attacked, and several died. It was propagated chiefly in the dwellings of the poor, by the vitiated air, by contact, and by the clothes of the patients.

Bernstein† describes relapsing fever as having run a similar course in Odessa to that observed at St. Petersburg. It appeared in the autumn of 1863, increased during the early winter months, and then gradually diminished, until it completely disappeared at the beginning of summer. In the autumn of 1864 it again broke out, and followed a similar course, disappearing in May, 1865. In Odessa, as in St. Petersburg, typhus prevailed at the same time with the relapsing fever; the former being the more severe, but the latter furnishing the greater number of cases. The general characters of the disease were those of the ordinary relapsing fever, and in most cases there was but one relapse. But in several cases, Bernstein says, there were two, or even three, relapses. These recurring attacks commenced more suddenly than the first, without prodromata, being ushered in with a single rigor. The first attack was always the longest, but the relapses were attended with a greater amount of prostration. This duration gradually diminished, until the third or fourth might have no longer duration than a paroxysm of intermittent fever, consisting of rigor followed by heat and sweating, and terminating within twenty-four hours. The intervals of freedom from fever increased as the duration of the paroxysms decreased. The mortality, as shown by Bernstein, was small. Of 60 cases observed in 1863-64 none were fatal, and of 77 cases in 1864-65 there were 3 deaths. One death occurred during the third relapse; another patient died of subacute pleurisy some days after the second attack; the third

* "Reply of the Russian Government to the English Ambassador," 'Gaz. Méd.,' xvi, 1865.

† 'Gaz. Méd.,' xxviii, 1865.

death was from abscess of the spleen. (Bernstein says that the spleen was frequently enlarged; the liver rarely.) Bernstein ascribes the outbreaks of the disease to the imperfect sanitary conditions prevailing among the labourers who had repaired in great numbers to Odessa to be employed in the public works, the hygienic conditions being more unfavorable in the winter than in the summer. He does not deny that the disease is contagious, but he did not meet with an undoubted case of communication by contagion.

Dr. Baldon* describes this fever in South America as presenting, in his opinion, a close analogy with that prevailing at St. Petersburg. In 1854 there broke out in Peru an epidemic which proceeded along the chain of the Andes, never at a lower elevation than 1500 metres, until in 1859 it had reached Bolivia and the neighbouring parts of Chili. The attack came on suddenly, without premonitory symptoms; it was characterised by violent rigors, severe frontal and occipital headache, coldness of the limbs, trunk, and interior of the mouth. This stage lasted from three to five hours, and was followed by increased headache, dry hot skin, and general sensation of heat. There is little or no thirst; pulse is increased in frequency (10 or 12 above the normal rate). There are severe pains in the epigastrium, in the lumbar and sacral regions, along the sciatic nerves, and in the calves, feet, and arms. The tongue is generally moist, not discoloured, and sometimes remains in this state during the whole course of the disease. These symptoms continue, with increased severity of pain in the muscles, during ten or fifteen days; but during the night the symptoms are increased in severity, so that the patient is deprived of sleep. The appetite is entirely lost; the intellect is not disturbed; the bowels are constipated or act naturally; the urine is scanty and high coloured. The prognosis is generally favorable; the symptoms disappear gradually, the nocturnal pains remaining longest. In fatal cases, which scarcely ever occur except during relapses, petechiæ are sometimes seen. At the end of a week, a fortnight, or one or more months, after the end of the disease, a relapse generally occurred, the disease having the same characters as before, but, from the enfeebled state of the patients, being more liable to end fatally. In a village of 1200 inhabitants, where Baldon had an opportunity of closely observing the disease, very few escaped; and he calculates that, on an average, each person had three attacks. The deaths were 250, equally divided between the two sexes; viz., children under 16 years, 92; adults, 110; persons above 60, 48. In the treatment bloodletting was found injurious; opium and its analogues were useless or hurtful; saline draughts were agreeable, but without therapeutic action; sudorifics were ineffectual; purgatives dangerous and useless. Baldon tried sulphate of quinine in the cases of two patients, in doses of four or five grains four times daily, the last dose being taken at 7 or 8 p.m. This had the effect of ameliorating the symptoms during the night; and were convalescent in three days. Encouraged by this result, he gave the medicine in other cases with equally good effect. But his supply of sulphuric acid being exhausted, he was obliged to give the quinine in pills, when he found it provoked

* "Acad. de Méd.;" 'Gaz. Méd.,' xix, 1865.

diarrhœa, without having any effect on the disease. This result was not materially modified by the addition of opium.

A general view of the symptoms and of the pathological phenomena noted in the Russian epidemic may be gathered from the papers of Dr. Fittermann* and Dr. C. Küttner†. The fever commenced abruptly, after prodromata lasting hardly twenty-four hours, with a temperature from 104° to 107° Fahr.; the exact degree was of less use for prognosis than the manner of its distribution; a high but evenly distributed temperature indicated little danger, whilst an uneven distribution, as in the bilious form, constantly foretold a serious illness. Morning remissions were constant, but only to the extent of $\frac{9}{10}^{\circ}$ to $\frac{3}{10}^{\circ}$ Fahr.; greater variations than these indicated danger, except at the period of deferescence. The pulse ranged from 100 to 160 in the febrile state, and 42—72 in remission. The pulse was small and weak from the first, abnormally quick, and very easily aggravated; intermittence, however, was not seen except where there was great general weakness, and dicrotism hardly ever. Owing to the low heart-force, stasis of blood took place in various organs, and the pulse itself was almost as extinct as in cholera, yet this seemed to have no appreciable relation to prognosis. From two to three, or from four to five exacerbations and remissions of the disease occurred. The crisis was ushered in, usually, by prolonged sweating, sometimes preceded by rigors and increase of fever, and occasionally with profuse micturition, purging, vomiting, and hæmorrhage; epistaxis was common in the decline of the fever, and in the enfeebled state of the patient was dangerous. The remissions were as complete as those of ægue.

Collapse and severe muscular pains were constant symptoms. The former was evidently caused by a depression of the nervous system, and a primary blood-poisoning peculiar to the disease. The pains in the muscles were found to coincide with early congestion and later tissue changes; in the latter the fibres showed the striæ indistinctly, and were filled with molecular, finely granular bodies; the addition of acetic acid destroyed these and left the fibres with hardly any longitudinal or transverse markings. Respiration varied from 20 to 32 in fever, and from 16 to 22 in remission; but great and rapid variations were observed in bad cases, and in one instance just before death the respiration reached 53. Ordinarily there were no physical signs of bronchitis, but there was dyspnœa in the commencement of the attack, which must have depended on depression of the vitality of blood and nervous system. The only prognostic information to be gained from hurried breathing is when it is united with orthopnœa or precordial anguish, especially if this happens coincidently with a fibrile exacerbation or with a too violent remission. In such cases large doses of quinine are needed; but the recovery will hardly be complete in 6 weeks. Vomiting was rarely seen in the *simple* form; but was often severe, long-continued, bilious and hæmorrhagic, in the *bilious* form of the fever. This symptom corresponded with the appearance, in cases which were dissected, of a swollen condition and strikingly green-grey colour of the gastric mucous membrane. In the bilious form of the complaint

* 'Petersb. Med. Zeitsch.,' i, 1863.

† 'Deutsche Klin.,' 1865.

there was obstinate and long-continued hiccough. Diarrhœa was usually not prominent, but sometimes, especially in protracted cases with hæmorrhage, was profuse and of evil omen. Remarkable enlargement of the spleen was recognisable almost from the first, usually attended with pain; and dissection found it, in some cases, adherent to the neighbouring organs from inflammatory exudation; in one singular case an adhesion to the colon had been perforated and part of the broken-down spleen tissue lay in the colon; spontaneous rupture of the spleen was noted 3 times out of 70 cases. The liver was enlarged, especially in the bilious form, but not so remarkably as the spleen; the left lobe seems to have been most enlarged; sometimes it was very tender, sometimes scarcely at all so. Jaundice often came on and vanished suddenly. The kidneys are little affected in mild cases; at most there is some hyperæmia. But in some cases there are important anatomical changes out of all proportion to the functional disturbance of the kidneys, which is slight, save that in a typhoid grade of the bilious variety uræmic poisoning occasionally occurs. Signs of acute parenchymatous nephritis were often detected with the microscope after death.

On the subject of the relapsing fevers of Russia, see also—

G. Whitley, report to med. officer of Privy Council on the fevers prevailing at St. Petersburg during the winter 1864-5. Botkin, 'Wien. Med. Wochnsch.,' 23, 1865. Heyfelder, 'Wien. Med. Wochnbl.,' 22, 31, 1865. Felix and Markowitz, 'Wien. Med. Wochnsch.,' 49—52, 1865. Eck, 'Gaz. des Hôp.,' 59, 1865. Kremiansky, 'Lancet,' i, 1865.

Typhus.

Dr. Gairdner* makes some very important clinical remarks on the nature and import of the "crisis" in typhus fever. He states that the ancient idea of the crisis as a point up to which the febrile phenomena have been steadily augmenting, and from which they *suddenly* decline, is not correct as applied to the typhus of to-day. On the contrary, the *descent* from the critical point is as gradual as the *ascent* in a typical case. In a large proportion of cases typhus, left to itself, without drugs or stimulants, will have its natural crisis (in the sense now specified) at or a little before the 12th day. A delay of the critical decline of the fever much beyond the 12th day is to be regarded with suspicion. But if the critical decline of the pulse-rate (especially when its strength increases) takes place at the proper time, it is of very little consequence how bad the other symptoms may look. The tongue may be as black as pitch, the cuticle as dry as leather; much delirium may go on, and the eruption may be brilliant or livid for days together, but (if there be no complication) *the patient will get well*. Only let well alone; it is not necessary to interfere, even though the delirium should become worse, or appear where it had never before existed.

Dr. E. L. Fox† examines the conditions under which typhus patients are treated, and specially discusses the question of receiving them into general hospitals or into special fever hospitals. Having given the statistics of mortality in numerous institutions, both general and special, he gives the following opinions as those at which he has

* 'Lancet,' Jan. 21, 1865.

† 'Edin. Med. Journal,' January, 1866.

arrived in consequence of his inquiries:—1. It is impossible to check the spread of typhus in a crowded locality, without taking away the patients from their own homes. 2. The admission of such cases to the wards of a general hospital must impair the advantages of such an institution, by necessarily restricting the number of beds it might otherwise contain. 3. No general hospital in the United Kingdom is fitted, by its construction, for the admission of such cases into the wards with other patients. 4. No hospital regulations are possible which could prevent the spread of typhus, if admitted into general wards. 5. The death-rate of typhus is lower when such cases are separated than when they are mixed with others. 6. In the former case the tendency to the spread of the disease among other patients is materially diminished. 7. By treating typhus cases in special fever hospitals, although the danger to officials is very great, yet the danger to the community is much lessened, from the fact that the number of attendants affected, compared with the number of cases treated, is very small. 8. Under certain regulations, the danger to the nurses in such special hospitals may be lessened. 9. It follows that typhus cases are better treated in the general wards of an hospital than at their own homes; better still in isolated wards of a general hospital than when mingled with other patients; best of all in separate institutions, with an entirely distinct staff of officers. 10. In a separate institution, situated on a high ground, with 1750 cubic feet of air for each patient, a large lateral space between the beds, and good ventilation and drainage, the death-rate of typhus, though varying according to the idiosyncrasy of the epidemic, may be considerably diminished.

Dr. Keith Anderson,* from a daily examination of the urinary excretion in six typhus-fever patients in the Edinburgh Royal Infirmary, found, as a general result, that in all the cases the quantity of urea excreted daily during the second week was decidedly below the standard of health, notwithstanding that the patient was in a state of high fever, with temperature and pulse above the normal rate. This differs, he says, from the results obtained by Dr. Parkes. He considers that the causative relation of retention of urea to less nervous symptoms in typhus fever and other diseases is supported by the fact that in his cases these symptoms were most intense while the urea excretion was lowest, and that their improvement coincided with or followed an increase in that secretion.

Dr. Da Costa† describes an invasion of typhus in Pennsylvania, which presented somewhat unusual symptoms. The affection may begin with a chill, followed by fever, which continues without remission. But in many cases pain in the back and limbs, loss of appetite, and diarrhoea, precede the fever; they last after it has set in, and are sometimes associated with epistaxis. Tongue dry, face flushed, eyes watery. Prostration, dulness of hearing, and mental hebetude, but, in early stages at least, rarely delirium. Between the 4th and 7th day an eruption appears on thighs, abdomen, and chest, more rarely on the arms; at first much modified by pressure, afterwards little influenced by it, and persisting till the defervescence. At the beginning of the

* 'Edin. Med. Journal,' Feb. 1866.

† 'Amer. Journ. Med. Sciences,' Jan. 1866.

second week symptoms of low fever become strongly marked; sordes in teeth, tremulous tongue, prostration, and delirium, or other nervous derangements, more evident. Patient is often deaf; skin cooler than at first; pulse ranges from about 100 to 130; bowels often retain their irritability. The end of the second week appears critical for prognosis; if the patient is to die, stupor, coma, and involuntary evacuations occur, and death comes by exhaustion; if the case turns favorably, the tongue moistens, the face gradually brightens, the pulse gets slower, &c. The diarrhœa occurred in 31 cases out of 49.

Other papers of importance on typhus are—

Morache, a typhus epidemic, with cases of relapsing fever ('Rec. de Mém. de Méd. Milit.,' Fevr. 1866). Grimshaw, influence of atmospheric changes on development of typhus ('Dub. Journ.,' May, 1866). Giovanni, the pathological ferment in typhus and intermittent, and the use of the sulphites ('Ann. Univ.,' Genn., 1865). Thore, delirium tremens at commencement of typhus ('Gaz. des Hôp.,' xxi, 1815). Wilks, cases of typhus and typhoid treated without stimulants ('Lancet,' i, 1865). Smoler, aphasia after typhus ('Memorab.,' x, 5, 1865). Oppolzer, on typhus (3 papers, 'Wien. Med. Wochensch.,' 1865).

Typhoid Fever.

M. Magne* says that epidemics of typhoid fever in Burgundy rage much more in the calcareous districts than in the primary soil, and further cites the report of M. Gaultier de Claubry on the epidemics of 1841 to 1846 to show that these prevailed in districts having a similar character of soil, and different from that of the departments which were not affected. He has collected 757 instances of epidemics of typhoid fever occurring in the 29 years preceding 1863. Of these, 564 occurred in 564 districts, having a soil of a formation posterior to the coal period; 64 in 54 districts with older soil; and 129 in 77 districts with mixed soil. In 1856, 292 communes were attacked with typhoid fever, of which 252 were on the soils of more recent formation. The triassic and oolitic soils are most liable to become the seats of epidemics of typhoid fever.

In connection with the previous researches of Zenker† on the changes in voluntary muscles in typhoid fever, the following observations are of interest.

M. Dauré‡ relates three cases of typhoid fever occurring in soldiers who had been two or three months in Algeria, and had been much exhausted by forced marches and other fatiguing circumstances. In the first case a man aged 23 was admitted into hospital with symptoms of a dynamic typhoid, on the eighth day of the disease. He was improving, when, on the seventeenth day after admission, he was seized with vomiting of greenish matter; the pulse rose, and an enormous enlargement of the upper and inner half of the right thigh was found. As deep fluctuation could be felt; an incision was made through the aponeurosis of the vastus externus muscle, and gave exit to about a quart of blackish-brown fluid, mixed with purulent sanies and large black clots. The patient died the next day. On post-mortem exami-

* 'Gaz. Méd.,' xliii, 1865.

† 'Ueber die Veränderungen der willkürlichen Muskeln im Typhus abdominalis,' Leipzig, 1862.

‡ 'L'Union Méd.,' lcvii, 1866.

nation the special intestinal lesions of typhoid fever were discovered. The liver and spleen were greatly enlarged. In the thigh was a cavity as large as a fist, formed by the aponeurosis of the vastus internus, which in that part was reduced to the condition of a blackish pulp. The inflammation extended only a short distance downwards, but the whole of the upper part of the muscle was affected in various degrees. There were found hyperæmia of the interfibrillar areolar tissue; discoloration and friability of the muscular fibres, which were surrounded by a dark-red exudation; rupture of blood-vessels; hæmorrhages; blackish, soft, and defibrinated clots; and a reddish-yellow pus, sometimes disseminated, sometimes collected in small abscesses. In no part was there found the yellow healthy pus arising from suppuration of the cellular tissue; but yellowish points, not yet liquefied, denoted the fatty degeneration of the muscular fibres. There was no inflammation on the gluteal or inguinal regions, or in the pelvis. In the second case a man aged 24 was admitted on the tenth day of an attack of ataxic typhoid fever, and died 16 days afterwards. Four days before death the patient, who had never complained of pain in the abdomen, felt slight pain in the hypogastric region. A slight prominence existed at the lower part of the recti muscles. After death no change was found in the skin or peritoneum at this point; but on opening the sheath of the recti muscles it was found to contain in its lower third blackish clots, which had separated, softened, and in some places destroyed the muscular fibres. Some of the fibres, when separated from the clot, appeared pale, but there was no trace of fatty degeneration or of pus. This case M. Davé regards as one of muscular apoplexy, of the kind described by M. Cruveilhier. The third case was that of a man aged 22, who died on the 30th day of an attack of a dynamic typhoid fever. The internal obturators, pyriformes, gemelli, and levatores ani, were found to be the seats of clots, and the right obturator internus also contained purulent sanies. None of these patients had any signs of scurvy, and M. Davé attributes the lesion described to the influence of the insalubrious state of the camp, together with cold and wet.

Dr. B. Ball relates the following:—A man, aged 35, a stone-cutter, was admitted into hospital under M. Piorry, with typhoid fever, and died in 12 days. He had no convulsions, and did not at any time complain of pain in the situation of the recti muscles of the abdomen. A post-mortem examination was made by Dr. Ball 24 hours after death; the weather was cold, and the body presented no traces of decomposition. The rectus muscle on the left side was almost completely torn across at its middle part. The torn fibres had soft rounded ends, lying irregularly side by side. At some points the distance between the torn ends was about four fifths of an inch. The rupture did not extend to the anterior and external part of the muscle. There was much ecchymosis, and a large amount of effusion of blood in the sheath of the muscle. Examined under the microscope, the muscle at the point of rupture presented a granular structure, and was infiltrated with a large quantity of fatty globules. The transverse striæ part disappeared for a distance of several millimètres; beyond this the muscle retained its normal structure. The muscle on the right side was also torn, but

less extensively, and its structure was degenerated in the same way as that of the other.

An extremely important paper was published by the late Dr. Southey Warter* shortly before his death. The principle on which this observer proceeded was that of examining, not evening and morning, as has usually been done, but by a single observation in the middle of the day. Among the many valuable facts which it brings out are the following:—In many diseases, *e.g.* pneumonia and typhus, the elevations of the temperature pretty closely follow those of the pulse. This is not the case, however, in typhoid. While the pulse rarely reaches higher than 120 before the eighth day, and this number is uncommon, the temperature rises as high as from 102°·4 to 104°·3 F. Exceptional cases, however, occur to this rule among children, as might be expected from the normal rapidity of their pulses. There are certain cases, also, of febriculæ, acute rheumatism, and tonsillitis, which present this peculiarity, of a low pulse with a high temperature at the commencement, but they are cases which actually have a strong general resemblance to the early stage of typhoid; with clear, white, perspiring skin, red lips, tinted cheeks, and dilated pupils. In typhoid the highest afternoon temperatures are reached about the 4th day; the highest temperatures in typhus usually on the 7th, sometimes on the 8th, rarely as late as the 11th or 12th. Both in typhus and typhoid there is a singular tendency of the temperature to rise every alternate day, especially in the odd days; in typhus rises are common on the 13th and 16th days; in typhoid, on the 9th, 11th, and 15th. As regards prognosis in these two forms, the most important facts which are ascertained by a single examination in the thermometer seem to be that a sudden rise of temperature in either of them indicates some intercurrent disease, and a sudden fall in typhoid indicates either diarrhœa or hæmorrhage. Dr. Warter thinks that hints may be gathered as to the treatment of delirium; thus, if the thermometer marks a low temperature, delirium should not be treated with bleeding, cupping, and other depressing remedies, but rather with wine and food. Counter-irritation, however, may still be applied behind the ears with advantage.

Dr. Warter considers that the thermometric differences between typhus and typhoid are so great as completely to settle any doubts which might remain as to their being separate diseases.

On the subject of typhoid fever see also—

Debeny, prophylaxis and treatment of cholera and typhoid ('Union Méd.,' 192, 1865). Goodridge, typhoid fever, with perforation of the bowel *on the 11th day*. J. Bernard, on typhoid fever (Paris, 8vo, 1865). Jourdanet, typhus of the Anahuac (this paper contrasts the types of continued fever prevailing at low and high levels respectively. 'Gaz. Méd.,' xiii, 17, 1865).

Malarial Fevers.

During an epidemic of intermittent fever in the malarial districts of the Ohio and Mississippi valleys in 1862 Dr. Salisbury† instituted a series of examinations of the expectoration of those residing in the ma-

* 'St. Barthol. Hosp. Reports,' 1866.

† 'Amer. Journ. Med. Sciences,' Jan, 1866.

larial atmosphere, where every one was more or less affected with miasmatic poisoning. In the salivary secretion and mucous expectoration of the morning he found a great variety of zoosporoid cells, animalcular bodies, diatoms, desmidiæ, algoid cells and filaments, and fungoid spores; but the only constant bodies, usually very abundant, were minute oblong cells, single or aggregated, consisting of a distinct nucleus, with a smooth cell-wall, and a clear, apparently empty space between the cell-wall and the nucleus. These bodies, which Salisbury regards as strongly resembling those of palmellæ, were found only below the summit ague-line; above this they were absent, though the other organisms above mentioned occurred at all heights.

To trace the source of these peculiar cells, Salisbury suspended plates of glass about a foot above the surface of marshy pools and partially submerged grounds. The plates were placed in position at night; and on being examined in the morning their under surface was found covered with large drops of water, containing many cryptogamia, but none of the minute oblong cells found in the expectoration. On the upper surface of the plates, however, these bodies were met with in large numbers. Having noticed that, after passing a nearly dry, rich, peaty bog, his breathing became dry and feverish, and his expectoration charged with the oblong cells, Salisbury suspended his glass plates over it, and found their inferior surfaces covered with the cells. He also examined, under the microscope, portions of a whitish incrustation, with which the earth of the bog was covered, and found that it was made up of aggregated masses of the cells referred to; that the plants from which they had emanated were palmelloid; that there were several species; and that in the larger ones grew several species of mucedinous fungi. From further observations Salisbury ascertained the following facts, among others:—Cryptogamic spores and other minute bodies are mainly elevated above the surface at night. They rise and are suspended in the cold damp exhalations from the soil after the sun has set, and fall again to the earth soon after the sun rises. In the latitude of Ohio these bodies seldom rise above from 35 to 60 feet above the low levels. In the northern, above the summit plane of the cool night exhalations, these bodies do not rise, and intermittents do not extend. The day air of malarial districts is quite free from these palmelloid spores, and from causes that produce intermittents.

Salisbury states also that, with the view of tracing more carefully the symptoms of the local fever produced in the mouth, fauces, throat, and lungs, by inhaling the cells and sporoid bodies emanating from the incrustation on the drying soil of malarial grounds, he spent some time, on several occasions, in the bog already referred to. In a very few minutes after his arrival he began to feel a dry, feverish, constricted feeling in the mouth, fauces, and throat, which increased until the fauces and throat became unpleasantly parched and feverish. The opposite walls, in swallowing, adhered together, and the normal mucous secretions were entirely checked. There was a constant desire to swallow and hawk and spit, without being able to expectorate much or in the least to relieve the dry sensation. The bronchial and pulmonary

surfaces soon became dry, feverish, and constricted, with a heavy congested sensation and dull pain. These symptoms lasted about 2 hours after leaving the bog. The same symptoms were experienced by Dr. Salisbury, as well as others, in visiting localities in which the palmelloid cells were found, and in some of which ague was prevalent; and in every case where ague prevailed, without a single exception, the "ague-plants" were found growing in the vicinity of the disease, and in no instance were they found where the disease did not occur.

Having related several instances which in his opinion further prove the connection between these cryptogamic bodies and intermittent fever, Salisbury relates that the urine of several hundred persons suffering from remittent and intermittent fever, on being examined, in some cases before treatment had commenced, in others after treatment had continued some days with or without interrupting the paroxysms, was found to contain the "ague-plant." The ague-plants, says Salisbury, occur in the urine in the form of little cottony flocks, so small as to be scarcely noticeable by the naked eye, and too few to render the fluid turbid. They are more abundant when the disease is severe and has continued some time. They are very light in colour, highly transparent, and appear to be developed in the bladder, renal pelves, and ureters. The results of the examinations of the urine Salisbury considers to establish the fact that the ague-plants are constantly being developed in the organism of the intermittent-fever patient, and that the urinary organs (with the perspiratory system) are the principal channels of elimination. Salisbury has also found, in intermittent fever, torula cells in the urine, indicating the presence of glycogenic matter, and also cholesterine, which he considers to be mainly formed in the spleen.

To obtain further evidence of the relation between the cryptogamic development and intermittent fever, Salisbury filled some boxes with surface earth and cakes of soil from a malarious drying prairie bog; and having carried them to a hilly district, five miles from any malarious locality, and where ague was unknown, placed them on the sill of the open second-story window of a room in which two young men slept. In six days both the inmates of the room began to feel ill, and both—one on the twelfth day, and the other on the fourteenth—had well-marked tertian ague. A similar experiment was attended with a like result.

Speaking of quinine as a remedy in ague, Salisbury denies that it is a *specific*. Quinine, he says, simply imparts tonicity to the system, and controls cryptogamic development, till nature, aided by remedial means for exciting the excretions, is able to eliminate the poison. To check the growth of ague-plants on soils, he recommends the free application of caustic lime.

The following papers are also important:

Ancelon, inhalations of pulverised quinine in intermittent ('Gaz. des Hôp.,' xlv, 1866). Sales-Giron, same subject ('Bull. de Thérap.,' Fév, 28, 1866). Thomas, pathology of intermittent ('Arch. d. Heilk.,' vii, 3 and 4, pp. 225, 289). Cantel, treatment of intermittent by antispasmodics instead of quinine in nervous women ('Bull. de Thérap.,' Sept. 30, 1866). Wiener, parallel between intermittent and cholera ('Wien. Med.

Wochensch.,' 89, 90, 1866). Frison, remittent pneumonia ('Rec. de Mém. Méd. Milit.,' Aôut, 1866). Provinzano, pernicious hæmaturia (Naples, 31 pp., 1866). Leavit, hyposulphite of soda in intermittent ('Amer. Journ. Med. Sciences,' April, 1865).

Cholera.

As it would be obviously impossible, with our limited space, to even glance at more than a few of the questions which have been raised by the cholera epidemics of 1865-6, it becomes necessary to make a selection from the more important topics which have been discussed. Leaving to the department of public health the questions as to the material means of propagation, and the important discoveries in prophylaxis which have been made, we shall notice (1) some of the principal contributions to a settlement of the dispute as to the prevalence or non-prevalence of a regular stage of premonitory diarrhœa; (2) opinions as to pathology; and (3) the most important suggestions as to treatment.

1. Upon the question whether there is or is not, as a rule, a stage of premonitory diarrhœa, we shall take first the affirmative opinions.

M. Guérin* has collected the statistics of the premonitory diarrhœa of cholera. He says that, in the epidemics of 1832, 1849, and 1853, experience has demonstrated the existence of a prodromic period, characterised by diarrhœa, preceding the development of cholera from two to ten days. In London Dr. Burrows, in the report of the Council of Health, says that there was scarcely an exception in 500 cases. In the Hospital Val-de-Grâce M. Lévy found, in 142 cases, 95 in which there was premonitory diarrhœa, 41 in which the prodromata were gastric or nervous, and 6 only without prodromata. The Committee of Hygiene records 740 cases out of 974 as having premonitory symptoms; but complete information was not obtained regarding all. In 1853-54 the Council of Health found on inquiry that of 5602 cases 4983 presented premonitory diarrhœa. The prevalence of premonitory diarrhœa has also been confirmed by M. Mélier.

Dr. Pantaleoni† gives the results of his observations made during an epidemic of cholera at Rome in 1837, in which 10,000 persons perished in two months. Of 112 cases of well-marked cholera which came under his care (of whom 39 died), the cholera was preceded by diarrhœa in 106. The diarrhœa was sometimes of only 6 hours' duration, or even less; but generally it lasted from 24 to 48 hours, or even several days. It was unaccompanied with colic or tenderness of the abdomen; but there were always anxiety and restlessness, which caused the attendants on the patients to imagine that they had pain. He says that he never had in his practice a case of the cerebral, nervous, typhoid, ill-defined fever which has been frequently observed to accompany or follow the stage of reaction. Where it was present in the patients of other physicians large doses of opium and stimulants had been given during the algide period; but he does not attribute all the cases of cerebral fever to the administration of these drugs. He protests, however, against increasing the quantity of medicine in the algide stage, as it is not absorbed, but accumulates, and, when reaction sets in, may act as a poison. His 6 cases in which cholera appeared suddenly occurred in—(1) persons

* 'Gazette Médicale,' 40, 1865. Compare *ibid.*, 44, 1865. † *Ibid.*, 42, 1865.

of weakened constitution, or infants less than a year old; (2) persons convalescent from acute diseases; (3) persons in good health, but who had been indulging in debauch. Pantaleoni says that his conclusions are confirmed by observations made at Nice in 1855.

M. Jacques* regards the preliminary diarrhœa as a necessary part of the disease. Dr. Macloughin† states that premonitory diarrhœa *invariably* precedes an attack of developed cholera, and claims to have been the first to make this observation so long ago as 1832. M. Barth,‡ in a clinical lecture at the Hôtel-Dieu, expresses his decided opinion that *cholera sicca* must be a rare complaint, as he had never seen it, and regarded the early checking of diarrhœa and vomiting as most beneficial and necessary. Professor Maclean,§ lecturing at the military hospital at Netley, dwelt very strongly on the importance of premonitory diarrhœa, and the evil effects of letting it go unchecked. Dr. Morehead, whose Indian experience has been immense, declares strongly in favour of the idea that there is a premonitory diarrhœa, which can be treated with material success.|| Dr. Goodeve,¶ also formerly occupying a high position in India, which gave him very large experience of the disease as seen in that country, speaks of premonitory diarrhœa as frequent, though by no means universal. Mr. Pain, too,** who had seen 2000 cases of cholera in 1849, declares that premonitory diarrhœa was present in by far the greater number of cases previous to collapse. But he goes on to speak of the diarrhœa in many of these cases as having been of a rice-water character from the first, and being quickly followed by full collapse, which seems hardly within the usual meaning of "premonitory" diarrhœa at all. M. Pietra Santa,†† in a report to the Académie des Sciences, says that premonitory diarrhœa occurs nearly always.

On the other side of the question M. Gibert‡‡ states decidedly that there is very often an entire absence of premonitory diarrhœa, a fact which he had the opportunity of verifying at the Hôpital St. Louis and elsewhere during the epidemic in Paris in 1865. Dr. Bowerbank,§§ who has had most extensive experience of cholera in Jamaica, says, "As far as my experience goes, I believe many of the worst forms of cholera took place without any premonitory symptoms or diarrhœa; and there is no doubt that in the most violent cases of this disease, known as '*cholera sicca*,' there are no alvine dejections at all."

M. Pellarin||| denies the correctness of the doctrine that there is generally a premonitory diarrhœa in cholera cases. It is, he says, impossible to say that diarrhœa will end in cholera while the evacuations are still bilious, watery, or glairy, and have not yet assumed the rice-water character. He states that in 1849, at Givet, several persons had cholera, which had been imported, without premonitory symptoms; and that 18 soldiers in the infirmary had diarrhœa, which in no instance passed into cholera.

* See his paper, cited below, on the treatment of cholera.

† 'Med. Times and Gazette,' Dec. 2, 1865.

‡ Ibid., Nov. 18, 1865.

§ 'Lancet,' Feb. 3, 1866.

|| Ibid., Jan. 20, 1866.

¶ 'A System of Medicine,' edited by Dr. J. R. Reynolds, London, 1866.

** 'Lancet,' July 28, 1866.

†† 'Gaz. Hebdom.,' xli, 1865.

‡‡ 'Bull. de l'Académie,' xxxi, p. 248

§§ 'Med. Times and Gaz.,' 1866.

||| 'Gaz. Méd.,' lxi, 1865.

Prof. Max. Pettenkofer,* in his account of the Saxon epidemic of 1865, remarks (incidentally) a fact which bears upon the supposed transition of epidemic diarrhœa into cholera. In Werdau people were not content with erecting a cholera hospital, but built a diarrhœa hospital also. Great numbers flocked to this latter, and it is possible that many of them were poor folk who used the place as a refuge rather than because they were really ill. Still, with all deductions, a very large number of undoubted choleric patients entered this establishment, and out of the total number of its inmates only 4 per cent. developed real cholera. Pettenkofer says that it is impossible to suppose that any particular medication had the merit, here, of preventing a development into cholera.

2. As regards the pathology of the disease.

M. Cloquet,† in a communication to the Académie de Médecine, comes to the following conclusions as to the pathology of cholera:—1. The cholera influence, whatever it may be, directly poisons the nervous system. 2. All the functional disorders observed in cholera are due to the modifications and disturbances which the nervous system, struck by the morbid principle, imposes on the functions of all the organs which are under its control. 3. We shall discover, it is to be hoped, for the successful treatment of cholera, therapeutic agents which, acting on the nervous system, in an inverse sense to the morbid principle, will neutralise its action, and annul its terrible consequences.

Dr. George Johnson, whose important theory of cholera was originally put forward in 1849, now brings it forward in a matured form.‡ The essential features of this theory are the following:—Cholera is the result of a poison received into the blood by the channel of the lungs or the alimentary canal, and its morbid influence is exerted in an irritant effect upon the mucous membrane of the alimentary canal on the one hand, and upon certain muscular tissues on the other. The diarrhœa and vomiting are the consequence of the first, and are in truth conservative processes, ridding the blood of a dangerous poison. For in virtue of the other irritant action—that upon muscular tissue—the morbid matter not only excites cramps in many of the voluntary muscles, but produces spasm of the smaller twigs of the pulmonary artery. The result of this pulmonary spasm is to reduce the current of blood through the lungs, and consequently to interfere with the due aeration of the blood. The result of this is, on the one hand, the singular loss of activity, the loss of voice, the mental apathy (without anything like a corresponding diminution of muscular power), and the remarkable arrest of secretions. Every secretion which requires an active oxidating process to elaborate its elements is suppressed, *e. g.* urine, bile, &c. The only secretions which continue are those which, like milk, are composed of materials which are more simply separated from the blood. In short, it is to the non-aeration of the blood which is occasioned by the almost complete arrest of the pulmonary circulation,

* 'Zeitsch. für Biologie,' ii, 1, 1866.

† 'Bull. de l'Acad.,' xxxi, p. 157, 1865-6.

‡ 'Notes on Cholera, its Nature and its Treatment,' London, 1866. See also various papers in 'Brit. Med. Journal,' 1865-6.

and not to the supposed thickening of the blood by deprivation of its serum from excretion into the alimentary canal, that the whole phenomena of collapse are due. He urges the strong contrast of the collapse symptoms with the phenomena which are produced by loss of part or the whole of the elements of the blood.

The central question as to Johnson's cholera pathology is the existence or non-existence of the pulmonary spasm, which he declares (in accordance with the original statement of Dr. Parkes) to exist. If this spasm does occur, and the patient dies in full collapse, the lungs ought to be found pale and collapsed, the pulmonary artery and right chambers of the heart full of blood, the left chambers empty.

In support of his theory Johnson also states that the early Indian practice, which consisted in the free use of purgatives, was far more successful than that which has been introduced since the idea prevailed that the loss of fluid was the cause of collapse. Again, he dwells on the remarkable effects occasionally produced by bleeding; this operation, so far from further depressing, has had an extraordinary reviving effect upon patients in full collapse.

In a clinical lecture delivered at the close of the epidemic of 1866* Johnson relates the experience of King's College Hospital during that period; 20 cases had been treated, and of these 12 died. Of the deaths, 6 occurred during collapse, and 6 in reaction. Of the 6 in collapse, 4 were not at all affected with vomiting or purging after they were admitted (it is not quite clear whether any of those had been free from all premonitory diarrhœa); two of them died within an hour after admission. The fifth patient was a very aged person, and already in a desperate condition. The sixth was that of a man, aged 35, who had been excessively purged for several days. Johnson remarks that it is not to be wondered at that prolonged diarrhœa and vomiting does not cure the disease in those who remain in poor and filthy dwellings, for there the exciting cause of cholera is being continually applied. Those who come into hospital do not present any such phenomena as continued diarrhœa with no amendment.

Johnson gives no detailed account of the state of the lungs in the 6 cases which died in collapse, but he leads us to infer that they were found anæmic as a rule.†

Upon this subject it is of great interest to consult the records of the Wapping District Cholera Hospital during the 1866 epidemic. Dr. Woodman‡ gives the post-mortem appearances in 14 cases of death in the collapse stage. Out of these there are 2 cases in which both lungs were collapsed and anæmic. In another the anæmic collapse was of one lung only. In 2 more anæmia of the upper lobes and congestion of the bases were reported. In the remaining 9 there was distinct congestion of the lungs; it is interesting to remark, that in three of these signs of commencing *pneumonia* were present (which throws

* 'Brit. Med. Journ.,' Nov. 10, 1866.

† An able pamphlet by Dr. Cockle ('Thoughts on the Algide Stage of Cholera,' London, J. Richards, 1866) discusses the pathology of cholera from the opposite view to that taken by Dr. Johnson. We regret that it is impossible to analyse it here.

‡ 'London Hosp. Reports,' 1866. Appendix on Cholera.

some slight doubt on the fact of the patients having died while still in collapse?). But, further, it is to be remarked that of the 2 cases in which both lungs showed genuine collapse 1 had the right chambers *almost empty* and the other had *both* sides of the heart *full*. It is, however, to be somewhat regretted that the exact *weights* of the lungs have not been recorded, a point which Johnson naturally considers very important.

A series of clinical facts, which bears directly on pathology, is dealt with by Mr. J. M'Carthy and Mr. Dove,* as resulting from observations at the London Hospital, with regard to the temperature in cholera. It was proved that there is no foundation for the notion that death results from great cooling of the body, for even in a case of extreme collapse, with rapid death, the thermometer at the time marked 96°·8 Fahr. in the axilla. The extreme ranges here seen in the disease were 91°·2 and 105°·6. In the stage of "reaction" the temperature was often below normal throughout, and was sometimes even lower than it had been in collapse. In a few cases comparative observation was made on the temperature of the rectum or vagina, and it was remarked that there was during collapse a considerably higher temperature in these parts (in 1 case a difference of 5°·4 Fahr.) during collapse, and that as the case progressed the internal temperature fell, while the external rose, till they were again equalised. Mr. F. Mackenzie† has some independent observations on the same subject; he comes to the following general conclusions:—1. The temperature in the axilla, rectum, or vagina, will show to some extent the severity of the attack. 2. The temperature cannot be estimated by the hand at all correctly, especially in reaction; a good deal of care and time is necessary to get reliable observations. 3. The temperature in the axilla will rise 2° Fahr. after a severe attack of cramps; this may be caused by muscular exertion and consequent acceleration of respiration at the same time. 4. The frequency of respiration and the temperature in rectum or vagina seem to have some relation to each other; the more hurried the respiration the higher the temperature will be. 5. Cases in which the respirations are more than 40 in the minute and the temperature above 101° Fahr. rarely recover. 6. The temperature of the body in roseola cholERICA is raised in proportion to the severity of the eruption.

In connection with these observations at the London Hospital we must cite the experience of M. Charcot.‡ This observer made his researches at the Salpêtrière, upon the temperature of the rectum, axilla, and palms of the hands, simultaneously. The patients were 10 in number; 7 of these were aged from 69 to 84, and the other three respectively 30, 59, and 47.

Charcot remarks, after detailing his cases, that, taking 99° Fahr. as the normal temperature, it will be observed that the temperature of the rectum was raised in every case except one (No. 7); the temperature observed in which was a minimum sometimes, but rarely, met with in old persons in health. Some of the highest temperatures (*e.g.* observations 3, 4, and 6) were met with at the same time that algidity and cyanosis were most

* 'Lond. Hosp. Reports,' loc. cit.

† Ibid.

‡ 'Gaz. Méd.,' xi, 1866.

marked, and where death soon occurred. In observation No. 2, a very high temperature ($105^{\circ}3$ Fahr.) was noted 5 hours before death; and an hour after death it had fallen to 104° . No inflammatory complication capable of accounting for the rise of temperature could be discovered on post-mortem examination. Observations 1, 8, 9, were of patients in the stage of reaction. Here the maximum temperature was $100^{\circ}75$ Fahr. (in a case of recovery), and the minimum $99^{\circ}7$ Fahr. In cases 2, 6, 8, a difference varying from a degree to nearly two degrees was noticed between the temperature of the rectum and that of the axilla. Hence the temperature of the rectum should be taken in preference to that of the axilla, as it more correctly represents the temperature of the internal parts. Several authors have already remarked that, in cholera, thermometer examination by the rectum shows an elevated temperature, while that of the axilla is below the normal standard. Zimmermann, for instance, found the temperature of the rectum in the algide stage to be $102^{\circ}5$ Fahr., while that of the mouth was 92° Fahr., and of the axilla only $90^{\circ}3$.

Dr. Handfield Jones* thinks (with Dr. Gull) that it is a mistake to suppose that zymotic diseases are cured by elimination; rather it would appear that the constitution becomes inured to the presence of the poison. In scarlatina (*e. g.*) the patient becomes convalescent while still charged with the poison, for he is still strongly endowed with the power of infection. Dr. Jones thinks there is very strong evidence to connect cholera with the malarious diseases, and quotes Trousseau, Bird, Annesley, Hutchinson, Dr. Charles Bell, Dr. Cormack, Dr. Billing, and Dr. Prout, as witnesses to this similarity, especially as regards the phenomena of collapse. He remarks that in 1854 there appeared to be a local atmosphere in an infected district (Paddington), which had a powerfully depressing effect on the nervous system even of healthy persons.

Dr. Beale† places much stress on the shedding of intestinal epithelium which takes place in cholera, and which he believes to be a vital change. Columnar epithelial cells are found profusely in the dejections and in the contents of the intestines after death; they are not all of one size, some being larger and some smaller. The tunics of the intestines give signs of a degenerative change which has probably been long going on. Thus, there are no small young epithelial cells seen occupying space between the points of attachment of the columnar cells, and no masses of germinal matter near the apices of the villi; there is also much fatty matter in the detached epithelium-cells. The Bacteria which have been found in the dejections signify nothing; they are frequently found in the fluids of a healthy human body. Dr. Gibb has seen them in milk fresh taken from a woman's breast. The denudation of the villi seems to Beale likely to prove an essential element of cholera.

Dr. Parkes‡ combats Dr. Beale's views. He says that epithelium is only found in small quantities in the stools, though it is present in

* 'Brit. Med. Journ.,' July 14, 1866.

† 'Med. Times and Gaz.,' Aug. 25, Sept. 22, Oct. 6, 1866.

‡ 'Med. Times and Gaz.,' Aug. 25, 1866.



large masses in the intestines after death. But then it is continuous and singularly unbroken; and he believes it is only detached post-mortem.

Dr. Gairdner* supports the same view.

Dr. Julius Klob† (in a chapter on the constant elements of the cholera discharges and intestinal contents) says that they always contain a large quantity of epithelium, pavement and columnar, but especially the latter. Cylindrical epithelium is, indeed, almost the chief organic element of the dejections. Every white or whitish particle in a rice-fluid is columnar epithelium of the small intestines. Cylindrical epithelium is the form chiefly found in the vomited matters; it is in moderate quantity, and comes from the œsophagus, pharynx, and mouth. (This treatise is also deeply interesting from its researches into the question of the *fungoid* origin of cholera, which our space does not permit us to enter upon.)

3. In relation to treatment, the statistics of the London Hospital‡ are particularly interesting. The following table must be explained by saying that Mist. Astringens is composed of logwood, ether, sulphuric acid, camphor, and capsicum; the "Mist. Ant. Tart." of tartar emetic and sulphate of magnesia; the "lead pill" of lead, camphor, opium, and creasote; the Mist. Quin. c. Ferro of quinine and the sesquichloride of iron.

Treatment.	Cases.	Died.	Recovered.
Mist. Astringens.....	48	31	17
Mist. Rubra (Sugar and Water)	56	28	28
Castor Oil	21	14	7
Saline Lemonade	20	6	14
Mist. Ant. Tart.	2	2	0
Mist. Quin. c. Ferro	3	1	2
Lead Pill.....	9	4	5
Total	159	86	73

There is nothing in the results of this comparison to intimate decided superiority of any one *medicinal* treatment over another. Even the apparent fatality of Mist. Astringens is to be accounted for by the fact that it was the early cases, during the severest time of the epidemic, that got this treatment. It is interesting to notice that cases treated with sugar and water (*i. e.* let alone) died in the proportion of not more than 50 per cent. out of so considerable a number as 56; while of 21 cases treated with castor oil it happened that 14 died, or 66 per cent. [Of course, however, the number of cases of the latter treatment is too small as an illustration of anything but that this treatment apparently offers no advantages over any other.] It is remarked, however, by the reporters, that castor oil, and also the Mist. Astringens,

* 'Med. Times and Gaz.,' Sept. 15, 1866.

† 'Pathologisch-Anatomische Studien ueber das Wesen der Cholera-process,' Leipzig, 1867.

‡ 'London Hosp. Reports,' 1866; Cholera Appendix, Mr. MacCarthy and Mr. Dove.

excited loathing in some cases, and could not be persisted with. And it is said that the free administration of saline lemonade, without drugs (besides that 14 out of 20 patients so treated recovered), was of the greatest comfort to the patients. Very high praise is given to the warm bath (98° to 104° Fahr.). "Often recovery appeared to be the direct consequence of the bath, the improvement being permanent; but in many more, removal from the bath became the signal for the return, more or less rapidly, of former symptoms. The testimony of all who had a fair opportunity of judging is unanimous as to the relief afforded by the warm baths, the most convincing being that of the patients, who, in some cases, craved incessantly for them, and remained in, at their own request, for nearly an hour at a time." Only a few desperate cases failed to derive any benefit.

As regards the reaction-stage, it is important to note that Dr. Andrew Clark employed, with great success, a powder composed of Hyd. c. Cretâ gr. ij, Pulv. Ipecac. gr. ss, and Pulv. Doveri gr. iiss, night and morning, with magical effect, in cases where the tongue had become dry and hard. Saline lemonade and chlorate of potash drinks were freely given. If the patient tended towards cure, mustard plasters or blisters to the nape were very efficacious, the improvement being generally attended by a renewal of the urinary secretion. Where severe headache was noted from the first, irrigation was used with some success.

Mr. J. G. French* lays down the three following as the causes which tend to avert the fatal result in cholera:—1. Diminution of the heart's action. 2. Diminution of the aeration of the blood. 3. Excretion of the poison by the alimentary canal. He declares that the fact of the blood only circulating so feebly arrests the action of the poison of cholera, just as we prevent the deadly effects of snakes' bites by ligature, &c. Then as regards aeration of the blood, it must be remembered it is not the case of common syncope or asphyxia, but of a condition of the blood in which it refuses to become aerated though exposed to air. The purging and vomiting is not merely a real relief to the congestion of the important intestinal organs, but also a means of carrying off the poison, which is plainly seen by the power of the evacuations, when swallowed, to reproduce cholera in other persons. The only treatment which is any use is to give the patient iced water, or Seltzer water, which assuages the thirst, and to pay strict attention to his sensations as to temperature. You must not submit him to disagreeable heat, for this materially adds to his sufferings and danger.

Dr. Jacquez† regards the premonitory diarrhœa of cholera as an essential part of the disease. To treat it, he knows no better remedies than emetics, aperients, opiates, and low diet. But even when these have produced a cure, the disorder may reappear in a day or two, and be followed by fully developed cholera. This relapse is rarely to be attributed to errors in diet or want of care. The diarrhœa does not preserve the patient from fresh attacks; it indicates a predisposition which it does not exhaust. If a person who has recovered from the diarrhœa expose himself to the emanations proceeding from other

* 'Med. Times and Gaz.,' July 16, 1866.

† 'Gaz. Méd.,' 47, 1865.

patients, he will receive new doses of the poison, and the disease will break out afresh.

In the treatment of confirmed cholera Jacquez objects to frictions, as being generally ill carried out, and therefore more injurious than useful. Warm drinks, and everything warm, are repugnant to the patients, whom he has known to recover after taking draughts of cold water contrary to the advice of their medical attendants. This has led Jacquez to recommend cold water. Some have advised the use of ice; but, according to Jacquez, it is more useful in the stage of reaction.

Jacquez calls attention to the fact that when, in the algide stage, vomiting is not present, the case is a very severe one;* if it cannot be provoked, the attack is fatal. The voice may be lost, the urine suppressed, the surface may be of icy coldness, there may be thorough cyanosis, and the pulse may be imperceptible; but if there be frequent vomiting, we must not despair. Vomiting, says Jacquez, when repeated five or six times, is seen to be followed by an increase in the frequency and strength of the pulse and a rise in the temperature. This he attributes to the circumstance that a large number of muscles are thrown into action. Why not, then, avail ourselves of the vomiting in cholera as a means of restoring circulation and heat, instead of employing impossible means? Everything which tends to repress vomiting should be discarded from the treatment, especially ice and opiates. Emetics may be given; but, from the repugnance of the patients, their use cannot always be continued. But pure cold water may be given in abundance. The patients call for it and drink it eagerly; it fills the stomach, and produces vomiting, immediately after which it is again demanded. Jacquez has seen patients swallow and eject 120 quarts of water in six hours, and in a large number of these cases there was scarcely any reaction.

M. J. Guérin† republishes an essay which he wrote in 1853. He says, correctly, that the problems to be solved are, to arrest the development of cholera, and to cure it when possible. He holds that, while diarrhœa is the most constant and important premonitory symptom of cholera, there are other prodromata which merit attention. These are, the gastric disturbance, indicated by the excessive secretion of gas and borborygmi; cramps; tendency to rigors, alternating with cold sweat; vertigo; general prostration, and *malaise*. Accompanied by these, the premonitory diarrhœa is a manifestation of the choleraic influence; it is the commencement of cholera—cholera itself.

Guérin proceeds to discuss the treatment of the premonitory stage, under the heads of empirical, symptomatic, and rational treatment. Properly speaking, he says, there is no treatment worthy of being called empirical. The true empirical remedy for cholera is not found; if it were, it would be specific. But in the symptomatic treatment a host of agents have been used to meet the symptoms already referred to—opiates, astringents, emollients, stimulants, antiseptics, calorificants, styptics, &c.

* The same remark was made at the London Hospital. *Vide* 'London Hosp. Rep.,' 1866, loc. cit.

† 'Gaz. Méd.,' 46, 1865.

The arrest of diarrhœa is, says Guérin, almost always accomplished by opiates, astringents, and emollients. But experience shows that—
 1. A large number of the patients in whom the diarrhœa has been suppressed remain ill; they have all the other premonitory symptoms, *minus* the diarrhœa. 2. In a certain number, in spite of the suppression of diarrhœa, the disease passes on to confirmed cholera; and this though the diarrhœa have been arrested three or four times. 3. A large number of those who recover are slow in regaining their sleep, appetite, strength, and other attributes of health. 4. A larger number, it is true, recover completely and rapidly. But in this case account must be taken of the auxiliary treatment—the application of warmth, regulation of the diet, and rest in bed. These Guérin believes to be more powerful agents in the treatment than the opiates. Of diffusible stimulants, charcoal, creasote, bismuth, and other remedies applied to special symptoms, he has the same opinion as of opiates.

Speaking of the rational treatment, he reiterates his statement that diarrhœa is not the only premonitory symptom of cholera. It is neither the cause nor the starting-point of cholera, but simply an important fact, the principal and pathognomonic symptom of the period; and it may be absent, as in cases where patients die of cholera as if struck down, and where the intensity of the action of the cholera poison manifests itself in a manner inconsistent with the idea of a local intestinal disease.

The other symptoms—the borborygmi, vertigo, *malaise*, &c.—all have the same signification as the diarrhœa; but Guérin founds his remaining observations on the presence of diarrhœa, which he considers in its physiological and pathological aspects.

Physiologically considered, diarrhœa is the means by which the cholera poison is eliminated. In its early stage it exists as a painless evacuation of watery fluid, interfering neither with sleep, appetite, nor work. Whether the eliminative functions of the intestines is provoked in virtue of a selective action on the part of the poison diffused through the system, or is simply the result of a local action of the poison on the digestive canal, he does not attempt to determine.

The complications, concomitants, and results of diarrhœa next demand its consideration as a pathological phenomenon. It must be regarded as a lesion as regards structure as well as function; the contact with the intestine of the toxic element cannot but have an effect on the intestine, and to it alone can be referred the colic, the excessive secretion, the gradual changes in the excreted liquid, and the alterations undergone by the follicles and epithelium.

Seeing, then, that diarrhœa is a work of elimination, and that it may also produce functional and structural disorders in the intestine, two principal indications of treatment are pointed out—to favour the elimination, and to protect the eliminating organ. If the state of our knowledge permitted, the primary consideration would be to neutralise the cholera poison; but as we cannot do this, we must take advantage of the eliminatory process, and assist nature.

The objects of treatment, Guérin says, may be classed as follows:—

1. To protect the eliminatory process in its spontaneous action. 2. To

aid elimination, and, if necessary, to provoke it. 3. To prevent and combat the accidents with which it may be complicated.

The first of these objects is to be carried out by not allowing the digestive process to interfere with elimination, *i. e.* by carefully regulating the diet. Slightly stimulant warm aqueous drinks, starch enemata, and rest in bed, have in many cases been sufficient for the recovery of the patients. They do not arrest diarrhœa, but they protect the eliminatory work against disturbance from within or from without, and to them is due the credit often attributed to opiates.

If the eliminatory process be not promptly and completely terminated, it should be aided by saline purgatives. Seidlitz water in doses of two or three glasses has the constant effect, when regulation of the diet is not sufficient, of putting an end to the diarrhœa. One precaution is necessary—the medicine should never be administered until a day after all food has been suspended; otherwise it may produce indigestion, and even, as has occurred in some cases, hasten the development of cholera. When gastric symptoms, such as nausea, fulness of the stomach, and want of appetite, prevail, emetics of ipecacuanha are to be preferred. Guérin says that he has recommended the eliminatory treatment since 1832; and that, after an experience of three epidemics, he is fully convinced of its value. It is not the diarrhœa alone which is attacked, but the disease. Under the treatment by elimination the cholérine does not pass into cholera; from the next day, or next day but one, the patient regains appetite and sleep, and loses his restlessness.

Rational treatment aims also at preventing and remedying the accidents which attend the eliminatory process, such as pain and dysenteric discharges. Here opiates are of real value; laudanum given by the mouth, and in enemata, diminishes excessive reaction, assuages pain and colic, and removes the dysenteric character of the intestinal discharges. In a word, it suppresses that which forms no proper part of the eliminatory process. Guérin recommends that each dose of an aperient should be preceded and followed by an enema containing laudanum.

Dr. Wilks* speaks strongly of the entirely *negative* effect of “astringents.” There has been no drug found capable of “astringing” in cholera, and it is therefore idle to talk of the good or evil effect of such remedies.

M. Lisle† gives his experience of the use of sulphate of copper. Of 36 patients treated by ordinary measures, 28 died; of 32 treated with sulphate of copper, 7 died. About $\frac{1}{3}$ grain of sulphate of copper and a very minute quantity of opium is given every quarter or every half hour, according to the severity of the case; it is continued till the temperature of the skin and the tongue is restored, and the pulse begins to be raised.

Dr. Burg‡ also recommends sulphate of copper, about $\frac{1}{6}$ th grain, by the stomach, and 5 to 8 grains by enema, every hour or two, and an ointment with sulphate of copper and belladonna to be rubbed in to the groins and axillæ.

* ‘Lancet,’ July, 1866.

† ‘Gaz. Méd.,’ 45, 1865.

‡ ‘Gaz. Méd.,’ 46, 1865.

[We regret that it is impossible, our space being exhausted, to find room for an excellent and most suggestive paper by Dr. B. W. Richardson,* which it is impossible to abridge without spoiling it. The injection of a compound nutrient fluid into the veins, by a most ingenious apparatus which Dr. Richardson has invented, is a peculiarly promising proposal; and the whole paper is replete with interest.]

Other papers, &c., on various questions connected with cholera are the following:

Bennet, Dr. Risdon, treatment of cholera collapse ('Brit. Med. Journ.,' Oct. 28, 1865). Bullar, hot mustard baths in cholera collapse ('Brit. Med. Journ.,' Oct. 21, Nov. 4, 1865). Ouvrière, use of ammonia in cholera ('Union Méd.,' 126, 1865). Chapman, J., ice to the spine in cholera and diarrhœa ('Med. Times and Gaz.,' July 29, Oct. 14, 1865). Clemens, vapour of chloride of copper as a disinfectant in cholera ('Deutsche Klin.,' xlv, 1865). Lebled, treatment of cholera in the algide stage ('Gaz. des Hôp.,' 129, 1865). Lasègue, on epidemic Asiatic cholera ('Arch. Gén.,' vi, p. 514, 1865). Peyrussan, influence of fever in the development of cholera ('Gaz. des Hôp.,' 127, 1865). Fournié, nature and treatment of cholera ('Union Méd.,' 126, 1865). Duclos, treatment of cholera ('Union,' 129, 1865). Dechambre, on cholera (Gaz. Hebdom., 41, 43, 51, 1865). Gardner, cholera and its treatment ('Brit. Med. Journ.,' Sept. 16, Nov. 4, 1865). Isambart, isolation of cholera patients in hospitals ('Gaz. Hebdom.,' xli, 1865). Ley, the treatment of cholera laid at the door of the whole world (Paris, 1865). Tiau, cholera in Constantinople ('Bayer ärzt. int. Bl.,' xlii, 1865). Milroy, G., geographical distribution of cholera ('Brit. and For. Rev.,' Oct. 1865). Pacini, specific causes, pathological process, and indications for treatment in cholera (Florence, 1865). Tommasi, on cholera ('Il Morgagni,' vii, 1865). Wormis, J., on the origin of cholera and the mode of its propagation ('Gaz. Hebdom.,' 40, 43, 1865). Zagiell, cholera in Egypt in 1865 ('Gaz. des Hôp.,' 119, 1865). Drasche, geographical and statistical history of cholera epidemic in 1865 ('Wien. Med. Wochens.,' 1865, several papers). Marroth, on the prodromata of cholera ('Union Méd.,' 126, 1865). Aubert, Roche, report on cholera in the isthmus of Suez, July, 1865 (Paris, 1865). Sagastreme, prophylaxis of the algide stage of cholera (El. Sig. Méd., Oct. 1865). Armand, the cholera in Cochin China ('Gaz. Hebdom.,' 39, 41, 42, 1865). Bourgogne, non-identity of Asiatic cholera with the choleraic fevers of Cochin China ('Journ. de Brux.,' Fev., 1865). Willemin, the manner of diffusion of cholera and the prophylactic measures against it ('Union Méd.,' lvii, 1866). Drasche, cholera in relation to war ('Wien. Med. Wochens.,' xli, 1865). Fernasini, cholera and its treatment ('Ann. Univ.,' Dec. 1865). Grimaud, relation between the cholera in Egypt and in Marseilles in 1865 ('Gaz. Méd.,' xxviii, 1866). Languaudin, contagion of cholera and necessity of quarantine (Nice, 1866). Poggio, on the influence of locality in the production of cholera ('El. Sig. Méd.,' Enero, 1866). Rogatis, on the immunity of workers in copper from cholera ('Gaz. des Hôp.,' lviii, 1866). Shrimpton, on the contagiousness of cholera ('Gaz. Méd.,' 1866). Vinke, on cholera ('Deutsche Klin.,' 1866, several papers). Whittle, bloodletting in cholera ('Med. Times and Gaz.,' May 19, 1866), &c. &c.

Cerebro-spinal Meningitis.†

The epidemic appearance of this disease in Germany commenced, upon a very limited scale during 1863, when it showed itself in Silesia. In the spring and summer of 1864 it appeared at Stettin, Brunswick, Bromberg (in West Prussia), and at Berlin, with some severity. A very limited number of cases again occurred in West Prussia in December, 1864. But in the end of January or beginning of February, 1865, an outbreak of considerable extent had occurred some 30 miles south-west

* "On the Physiological Formula of Cholera, and of the Treatment," 'Med. Times and Gaz.,' Aug. 6th, 1866.

† The "spotted fever" of American authors.

of Dantzic, in the district of Berendt; in this district the deaths between that time and the middle of March were 347; all of these, with the exception of 17 cases, were in children under 14 years of age. From the Berendt circle the disease extended to the Carthaus circle (400 fatal cases), and from that to the extramural circle of Dantzic, where it was confined to the Nehrung and that part of the Niederung which adjoins the Vistula, appearing on either side of the Dantzic arm of the river simultaneously. In the town of Dantzic itself there were never more than a few cases; there were a few cases also in the circles of Elbring and Stargardt. This epidemic of the Vistula terminated by the middle of April. The total number of cases is reckoned by Meissner* as 2000, and that of the deaths, more doubtfully, as over 1000. From the report of Dr. J. Burdon-Sanderson,† who was sent over by our Government to report on this epidemic of the Vistula, this estimate is likely enough to be correct, as he knew of about 900 deaths, and it is probable that the whole number would not immediately appear. From the beginning of the year up to May the disease had also invaded Pomerania, Hanover, Westphalia, Frankfort, Würtemberg, Thuringia, Saxony, Austria (Vienna), Bavaria, and Baden; in the last two countries it was extensively diffused, and there were a great many cases.

Burdon-Sanderson's description of the symptoms is important. He examined 56 cases; and he reports that in all, except two, the onset of the disease was sudden, the patient having been in good health up to the moment of the attack. This agrees generally with what the German observers relate:

"In adults the disease begins almost invariably with shivering, profuse vomiting, intolerable headache, and giddiness. After these symptoms have continued for several hours the patient's thoughts become confused. The headache continues, while other pains fix themselves in the muscles of the nape of the neck, of the small of the back, or of the abdominal wall. At this part of its progress the malady advances so rapidly that within a few hours after the appearance of the first symptoms the patient becomes violently delirious, while at the same time the head is thrown back, and the thighs are drawn up by muscular contraction. The delirium usually lasts for a few days only. In the worst cases the patient lapses into profound insensibility, which continues until death. In a few rare instances he regains complete consciousness as the delirium ceases, and enters on convalescence. Much more frequently he is left on the third or fourth day of the disease, if he survive its first onset, in a state of extreme nervous depression, which is usually of long duration. This condition is characterised by impairment of consciousness, rather apparent than real, perversion both of common and special sensibility, marasmus, and excessive muscular weakness.

"During the continuance of the state of depression the patient is liable to frequent recurrence of the initial symptoms. Although so

* 'Schmidt's Jahrb.' ('original Abh.'), p. 123, 1866.

† 'Report to Med. Officer of Privy Council on the Epidemics of Cerebro-spinal Meningitis prevailing about the Lower Vistula,' 1865.

profoundly prostrate and indifferent to external impressions that he is incapable of replying to questions, he frequently utters piteous cries of pain. At night he sleeps little, usually wanders quietly, and is often subject to hallucinations. At any moment his life may be imperilled, either by secondary affections of the lungs or other vital organs, or by a recrudescence of the primary disease.

"As complete consciousness returns, and the patient resumes his relations with the external world, he may either find that in the course of the malady he has become paralysed, or that his sight or hearing are destroyed, or, on the other hand, he may be so exquisitely sensitive that light and sound are intolerable, and all other external impressions painful. Even if he escapes these consequences, he is left in a pitiable state of muscular weakness and exhaustion, from which he very slowly recovers.

"The above description is completely applicable to those cases only in which the tendency to an early fatal termination manifests itself in the violence of the symptoms of invasion. Other cases are met with in which, although the evidences of cerebral disturbance are, from first to last, confined to sleeplessness and night-wandering, the subsequent development of the disease is similar. In these cases the dangers and liabilities to which the patient is exposed are as serious, and the progress as tedious and exhausting, as in the others."

The headache and vomiting which almost invariably precede the occurrence of delirium (for a few hours only) are called by Sanderson "symptoms of invasion," and he points out that at this time there is no special localisation of the pain at the *back* of the head. An important fact which stands out in his observations is, that the contraction of the muscles at the back of the neck, which has been so generally noticed, never in any case was so great as to deserve the name of tetanic. It appeared as if the attitude of the patient (with the trapezius contracted and the head drawn back) was merely the consequence of the severe pain in the muscles, the patient maintaining this position to ease himself; and this idea was borne out by an analogous attitude evidently intended to relieve painful *abdominal* muscles, &c. Sanderson thinks it of the utmost importance to note that, in some patients whom he saw early in the first stage (the day following delirium), there was not a trace of retraction of the neck, or of stiffness, or anything else remarkable in the muscles.

The apathy or stupor into which the patient generally passes after the initial stage (with, usually, a transition period of violent delirium) is remarkable for its duration. Thus, in six patients, in whom there was violent delirium at the outset, the patients subsequently remained in a state of complete indifference to external impressions for periods varying from 7 days to 5 weeks, or a mean duration of 19 days. In one case, in which stupor followed the initial stage *without* preliminary delirium, the apathetic state lasted 5 weeks; the patient frequently talked incoherently, and gradually became more and more emaciated. In several children the condition was undistinguishable from that of acute tuberculous hydrocephalus. Several of the adult patients could be roused sufficiently to answer some questions. All through the apathy the

pains continue more or less. There are occasional recrudescences, often so slight as readily to escape notice, sometimes so severe as to assume the character of relapses. Sometimes these relapses look like the reproduction of the symptoms of invasion. In general a case with relapses is one destined to be tedious, but not fatal, but the non-fatality is not absolute. Adults are not so liable as children to recrudescence of the original symptoms, but there are often marked variations in the constitutional state and intensity of pain.

The temperature was noticed by Sanderson as constantly elevated at all stages of the disease, seldom falling below 100° Fahr. The highest point was just at, or immediately after, the close of the symptoms of invasion, viz., 102° to 104° , or higher, in children. Subsidence of pains and general improvement were always coincident with lower temperature, and *vice versâ*. Correspondingly with high temperatures the pulse assumed the characters of less arterial tension; but there was no discernible relation between its frequency and the stages of the disease, though the pulse-rate fluctuated from time to time. The frequency, also, of respiration seemed to have no intelligible rule, but the occurrence of *embarrassment* was always indicative of a proportional gravity of the case. Death always seemed to take place by apnoea, the respiration suddenly becoming irregular and slower after having gradually got faster up to a certain point.

The increased sensibility of the surface which is nearly always observed is, in Sanderson's opinion, a mere interlude to active pains, or a stage towards recovery from the state in which acute pains are present.

Among the most interesting changes which are observed in the disease are the nutritional changes which occasionally occur in the eye. Sanderson mentions several cases as coming under his own notice or that of other physicians in West Prussia during the epidemics of 1864-5, and enumerates synechia posterior, opacity of the vitreous humour, and severe iritis, as results which were observed.

Deafness occurred in 10 cases seen by Sanderson; and he has no doubt, from the inspection of existing pathological specimens of similar cases, that the cause of it is an inflammatory change in the internal ear.

The post-mortem appearances recorded by Sanderson were those of inflammation of membranes of brain and spinal cord, viz., great congestion of cerebral sinuses and diploe; plastic exudation of varying extent in hemispheres, basis cranii, or cerebellum, or in all these situations; congestion of vessels of cord, and purulent exudation beneath arachnoid; serous or sero-purulent fluid in lateral ventricles of the brain, &c.

The pathology and etiology of epidemic cerebro-spinal meningitis have been greatly debated, and still remain obscure. The two principal views as to the nature of the disease are, on the one hand, the *local* theory, that, namely, which supposes it to be a simple cerebro-spinal inflammation, and the coincidence of a number of cases to depend simply upon climateric or endemic conditions; and the other, which regards it as a constitutional malady, with certain local symptoms of an unusual

kind. The first or local theory of the disease is supported chiefly by Niemeyer.*

Niemeyer, who observed the disease in Baden, remarks the absence of prodromic symptoms, the disease commencing with phenomena which undoubtedly point to the meningeal affection, and the trifling degree of the febrile in comparison with the nervous phenomena. The post-mortem appearances are constantly those of extensive inflammation of brain and spinal cord, differing in nothing from that observed in the well-known sporadic form of the disease; while there is no specific change resembling, for instance, the intestinal follicular disease of typhoid; neither are there changes of other organs, such as the lymphatic glands, the spleen, &c. The exanthematous eruptions observed are no proofs of a fever of the typhus type, for herpes is common enough in pneumonia, &c. Niemeyer does not confirm the statement of French observers as to the uselessness of bloodletting and antiphlogistics; on the contrary, though the very bad cases will die, do what you will, there are some of the more moderate ones in which this treatment seems to be really efficacious. It would seem as if the French epidemics were of a different type from that of Baden. Niemeyer remarks that secondary inflammation of the lungs, of the joints, and of the pleura, are rare; and of course they are observed in inflammatory and exudative processes where there is no febrile blood infection. The only fact in favour of infection is the occurrence of the first cases and the greatest spread of the disease at Rastadt, to which some recruits from Eastern Prussia had come; and this, again, is neutralised by the circumstance that simultaneously the disease appeared in many parts of Germany.

Niemeyer speaks of the infrequency, on the whole, of general convulsions, and remarks that a meningitis which does not involve large effusion, the compression of capillaries, and the consequent diminution of blood supply to the hemispheres, cannot be expected to produce this effect. It is in the hydrocephalic form of meningitis, with large effusion, and in the case of tumours, &c., compressing the encephalic organs, that convulsions are to be chiefly met with. He explains the neuralgic pain in the limbs by a local deposit of exudation in the roots of the nerves. He explains the nutritive changes in the eye by a similar local extension of the inflammation to the neurilemma of the trigeminus. He points out that the purulent conjunctivitis, followed by ulceration of the cornea and hypopyon, and the other changes—ptosis diplopia (synechia posterior) and iritis—are exactly equivalent to the effects which have been experimentally obtained by section of the Gasserian ganglion.

An important difference exists between the observations of Niemeyer (and, indeed, of several of the German observers) and those of Sanderson, with regard to the temperature. Whereas the latter found a constant and considerable elevation of temperature, even in the early stages, Niemeyer notes that on the first and second days, in his experience, it was often but slightly raised; it was only a little while before death that it rose as high as 104° or more.

* "Die Epidem. Cerebro-spin. Mening. nach Beobacht. in Grossherzogthum Baden," Berlin, 1865; 'Schmidt's Jahrb.,' 1, 1866.

The constitutional theory of the disease is most prominently represented, in Germany, by Wunderlich,* who observed the disease in 1864-5 in Leipzig. He arranges the phenomena into two groups—the local and the constitutional; and he says that, according to the intensity and rapidity of the disease, there are three grades:—(1) In the most severe and rapidly fatal cases both local and constitutional symptoms are highly developed; (2) in less severe cases the nervous symptoms are the most prominent, and give the only measure of the disease; and (3) in the comparatively trifling the cerebro-spinal symptoms are also the more prominent, but they are more scattered, and might easily have a different significance were it not for the epidemic occurrence of the cases, and if the unusual exhaustion, palpitation, vomiting, and characteristic signs of general disturbance, were not present. These latter cases Wunderlich asserts are especially distinguished by enlargement of the spleen, tendency to hæmorrhages, exanthemata, and especially by the contrast between the pulse-rate and the temperature. The fever lasts but a short time, but it reaches considerable heights, while the pulse is at or below the normal frequency, and only becomes quicker *when the temperature has become normal*. In these last cases there are some unusual symptoms. Not only is the curious state of temperature very interesting, but more especially the enlargement of the spleen—a fact of which there can be no doubt, since it is mentioned by so accurate an observer as Wunderlich. But it appears to have been almost absolutely unknown in the experience of others; and, indeed, Dr. Beckh† expressly makes its non-occurrence one of the important points of distinction from relapsing fever, of which disease it is a very characteristic symptom.

The doctrine of Niemeyer has been carried to a still greater extent by Dotzauer‡ and Lindwurm,§ who regard cerebro-spinal meningitis as an altogether local disease. The opinion of Dotzauer is particularly important, inasmuch as he had a large field of observation (222 cases), and has given an extremely able report of his experience. On the other hand, the constitutional theory has been carried to a high degree by other authors. Grauvogl and Buchner, at Nuremberg and Munich respectively, have sought to identify the disease with relapsing fever; and in this country Dr. Murchison|| supported very ably the view that the German epidemic was only a variety of typhus. He pointed out that the principal symptoms, such as violent pain in the back of the neck, retraction of the head, delirium or stupor from an early period, &c., and the characteristic post-mortem signs of true cerebro-spinal meningitis, have not infrequently occurred in cases of undoubted typhus, particularly in certain epidemics. He observes that the circumstances under which typhus prevails—winter time and a condition of overcrowding amongst indigent persons—are those also of cerebro-

* 'Arch. der Heilk.,' 1864, p. 417; 1865, p. 268. H. Meissner in 'Schmidt's Jahrb.,' 1866.

† 'Meningitis Cerebro-spinalis epidemica und Typhus oder Febris recurrens,' Nürnberg, 1865.

‡ 'Bayer-ärzt.-intell. Bl.,' 12, 1865. Meissner, in 'Schmidt,' 1, 1866.

§ Ibid., 21, 1865. Ibid.

|| 'Lancet,' April 22, 1865.

spinal meningitis; and he denies, *seriatim*, the validity of the 4 heads of diagnosis which were laid down by Liddell* from American experience, viz.—(1) the rapid course of meningitis (for typhus also may kill in a few hours); (2) the convulsions often seen in epidemic meningitis (typhus may also be attended with such); (3) early occurrence of coma in epidemic meningitis (this may also happen in some cases of typhus); and (4) the early occurrence of the eruption in epidemic meningitis (for Murchison has seen the eruption of typhus developed on the third or fourth day).

However, there is one fact which emerges from the extensive histories of the German epidemic with great uniformity, viz., the non-existence of anything like well-marked contagiousness in epidemic cerebro-spinal meningitis. This is particularly noted by Sanderson, and the same story is told by all the principal German observers; and this fact (which seems established) appears to negative the supposition that this disease is either a typhus or a relapsing fever with accidental complications on the side of the nervous system.

As regards the *causation*, Sanderson's researches are very interesting; and the results he arrives at are identical with those reached, so far, by the best German authorities. He rejects the idea that either overcrowding, want of ventilation, badness of food, or other sanitary defects, have any very direct or important share in producing the disease. On the whole, he thinks that severe cold is at least the most powerfully predisposing cause, and that to this is probably to be added some influence of malaria. Both these momenta evidently played a part in the epidemic in the neighbourhood of Dantzic. His view would, perhaps, be best expressed by saying that cerebro-spinal meningitis occupies a very similar position in the list of diseases which are undoubtedly epidemic to that of diphtheria. In fact, the mode of origin and spread of the disease must be regarded as peculiarly obscure.

The prognosis of the disease is, by all evidence, very bad. Niemeyer gives the following as the statistics of the Baden epidemic:—Of 126 cases 38 died, or 30 per cent. The mortality of the two sexes was about equal. Of children from 4 to 5 years old there were no less than 54; 18 of them died, or 33·3 per cent. Of children from 6 to 14 years old 40 were attacked and 9 died, or 22·5 per cent. Of persons from 15 to 23 years old 27 were attacked and 10 died, or 37 per cent. The 5 remaining cases were above 23 years old; 1 of these died.

In the West Prussian epidemic, as already shown from the evidence of Sanderson and the figures quoted by Meissner, the proportion of deaths was much higher, probably not much less, on the whole, than 50 per cent.; and this corresponds with the general severity and extent of the epidemic, which was greater in this part of Germany than in any other.

Treatment was, in Germany, almost entirely directed to local antiphlogosis (cold applications and leeches to the nuchæ and behind the ears), and the use of calomel in large doses, with occasionally the administration of quinine where there were periodic occurrences of the muscular pains. It seems to be Sanderson's opinion that in some cases

* 'Amer. Journ.,' Jan. 1865.

the leeching, &c., did real and even striking good, though in many others it had no effect. Niemeyer, as already stated, believes that antiphlogistic treatment did much for those cases which were not past all hope of benefit.

[The German epidemics offer so wide a field for studying cerebro-spinal meningitis, that it is the less necessary to treat of its development in America, for which we have no space left. It has been known in the latter country as "spotted fever," and the same differences of opinion as to its real nature have occurred there as in Germany and elsewhere. The papers of Dr. A. Stillé* and Dr. Liddell† give reference to nearly all the other American writings on the subject. For further information as to the earlier German epidemics, see Hirsch, 'Berlin. Klin. Woch.,' 19, 1864.]

Yellow Fever.

An important contribution to the history and etiology of yellow fever was supplied by the experience of a small epidemic of that disease which was brought to Swansea in the early part of September, 1865. Dr. George Buchanan‡ reports on it as follows :

The ship *Hecla*, a wooden sailing-vessel, laden with copper ore, arrived in port on September 8th and was placed in dock, having had several deaths from yellow fever during her passage from Cuba, and having on board 3 men sick of that disease, 2 of them recovering, the 3rd very ill. Two passengers and the crew were landed immediately, and distributed themselves over the town ; the man who was severely ill was taken to a small and dirty cottage in a court in the town, where he got rapidly worse and died the next day. The nature of the disease, which had been concealed by the master of the ship, was now discovered by the authorities of the town. The rest of the story will be best told in the words of Dr. Buchanan's able report ; the extracts which we give cannot be abridged without spoiling them.

"Let it be recalled that in the present summer, and at the time of the outbreak, there had been extremely little fever of any sort in Swansea. What did exist was ordinary typhoid, and there were no cases of this on the island. There was not, and there had not been for many years, an instance of relapsing fever.

"The table shows that between September 15th, when the first case occurred, to October 13th, when the last case became convalescent, there were 22 cases in which the diagnosis of yellow fever could pretty certainly be made, and 7 other cases in which the circumstances of exposure or the character of the attack led to a more or less strong suspicion that the illness was of the same nature.

"Of the cases diagnosed yellow fever 13 died, besides the man brought by the *Hecla*, and 7 recovered. Of the doubtful cases 1 died, and 6 recovered.

"Of the nature of the disease I am able to assert, with the assent, I believe, of the whole of the medical profession in Swansea, the three

* 'American Journal of Med. Sciences,' January, 1865.

† Ibid.

‡ 'Eighth Report of the Medical Officer to the Privy Council,' 1865, p. 442.

following propositions, which I give in the order in which they were successively established:—1. That it has been no ordinary English fever. 2. That it has not been the relapsing fever, which in certain epidemics has been observed to present varieties simulating tropical yellow fever. 3. That it is *bonâ fide* the West Indian yellow fever itself. The records of a case, which differed in no essential respect from most other fatal cases, and which is chosen for quotation here because one day's note contains all essential points, will exhibit something of the evidence on which these propositions are based.

"Rachel Williams, aged 35, married, living on the island at the top of Cobre Row. Ailing in no definite way for a week before 27th September, when she was seized with diarrhœa and vomiting, but on 28th was well enough to go to church in the evening. On the morning of 29th had rigor and intense frontal headache, and when seen by Mr. Andrew Davies at 10½ a.m. had violent pain in loins and along spine, eyes suffused and face flushed, great general heat of the skin; no jaundice; pulse 132. Ordered calomel and James's powder every four hours, with cold to head. Seen again at 10 p.m., when a slight improvement was noted.—September 30th, 10 a.m. Less pain in head and back; pulse 118; temperature much less; no vomiting or epigastric pain; two stools; plenty of natural-looking urine.—October 1st. Vomited four times in night between 3 and 5 a.m.; everything vomited was black; light brown stool last night. Seen by Mr. Davies and myself at 2 p.m. Face pale, lips bluish; peculiar frown; no wandering or coma. Says 'she feels better.' Skin cool; sweating, feet cold; temperature in axilla 98·4°; trace of yellowness in conjunctivæ; no œdema of feet; pulse 94, very small and soft; tongue dryish black; frequent efforts to vomit; vomita copious black, a black powder suspended in a somewhat glairy looking liquid; no tympanitis; epigastrium very tender; two stools to-day; one seen is semi-solid, mixed black and grey, mottled. No urine passed to-day, unless a teaspoonful of pale fluid with the stool be urine. The black vomit was strongly acid, and when microscopically examined was found to consist (A) of blood-corpuscles, (a) unchanged, red and white, (b) small and shrunken; (c) disintegrated, (d) massed into large yellow irregular lumps, in which separate shrunken corpuscles were sometimes recognisable; (B) of epithelium, (a) squamous, (b) columnar, (c) spheroidal, (d) free nuclei. The vomit when filtered yields a liquid almost colourless, and having none of the reactions of bile. On the same day, October 1st, at 5 p.m., delirium began, and when seen by Mr. Davies at 6 p.m. she was insensible, with trismus and general rigidity of the muscles. Skin cold, but not blue; frequent vomiting of some black fluid; pulseless at wrist; no urine. Died at 6.50 in same state. When her body was seen next day, was very yellow, with streaks of blue in the face, and the hands and finger-nails blue. I pressed hard for an autopsy, but her husband would not permit it.

"This woman and her husband lived by themselves in a tidy house on the island at the entrance to Richardson's copper-ore yard, which adjoins the Cobre Company's yard. In a straight line, the house would be about 130 yards from the place where the Hecla unloaded, and

nearer still to the spot where her ore was deposited. The patient's husband (whose case is given in the supplement) was on board the *Hecla* once between the 10th and 17th of September. She herself had not been on the vessel, but 'had passed her in going to town, as hundreds of other people did.' None of the crew, nor any of their goods, had been to the house, nor has she met with any of them. Mrs. Williams went on the 23rd September (4 days before her first vomiting, and 6 before her definite headache) to see the dead body of her neighbour, Mrs. Brown, whose case is also recorded in the supplement. She was not then alarmed about the fever, but afterwards got very fearful of it.

"The patient was seen during life by several medical men, who stated that the fatal cases which they had themselves recently attended exhibited nearly identical characters. It is also well to mention, as having influenced public opinion at Swansea quite as much as the assurances of the doctors, that a Cuban gentleman, Don Pedro Ferrer Landa, saw the body of Mrs. Williams after death, as well as another case which afterwards recovered, and that he recognised the precise appearances which to a practised non-medical eye are most striking in the progress of yellow fever, and after death from it. He had previously been as incredulous as the doctors themselves at first were as to the possibility of yellow fever extending itself in English latitudes.

"The sudden accession, with intense headache and spinal pain; the high fever, giving place soon to collapse; the black vomit and yellow skin; the suppression of urine; the retention of the faculties—these are symptoms which, with death on the third day of illness, appear to establish beyond question the diagnosis of yellow fever.

"With regard to the constancy and character of the vomiting, a reference to the annexed cases will show that the symptom was present in all the 15 fatal cases. The vomited matters were unequivocally black in eight of them. Two of these eight vomited some florid blood in addition. In 4 of the fatal cases the vomita were of dark matters, compared variously to coffee grounds, chocolate, and beef-tea grounds, and in one of these vomita blood was also found by the microscope. In another fatal case the vomita consisted of bile and mucus only, and in two others the evidence differs as to whether the sickness was of black matter or not. In the seven cases of recovery vomiting was observed in 6. In none was it black, but in 1 case it resembled beef-tea, in 2 it consisted of bile and ingesta, in 2 of ingesta only, and in 1 the characters were not noted.

"To the evidence of symptoms that the outbreak of fever was yellow fever it is to be regretted that the corroboration of post-mortem examinations could not be added. There was in the minds of the survivors an objection that proved insuperable to permit such an examination to be made.

"As to the connection of the disease with the *Hecla*, the evidence appears conclusive—(a) From the fact that there had been for months no other vessel in the harbour that had had any yellow fever on board. (b) From a consideration of dates. A vessel which has acknowledgedly lost part of its crew from yellow fever, and which lands a man on her

arrival to die of that disease in a few hours, enters Swansea on Sept. 9, and remains there till Sept. 28. From Sept. 15, six days after her arrival, to Oct. 4, six days after her departure, cases of a disease previously unknown at the port break out, with the symptoms and fatality that mark it for yellow fever. The vessel leaves the dock on Sept. 28, and takes up a distant position near the harbour mouth, and from Oct. 4 to Oct. 23, the date of this report, there is no fresh case; (c) The locality where the disease occurred again connects it with the Hecla. In a town of 30,000 people, some 18 cottages are scattered on a little low-lying island, to which the vessel importing yellow fever comes, and on which she discharges her cargo. Of the 22 cases of the fever (excluding doubtful cases of it) that subsequently break out, 11 occur in persons resident on the little island, 5 in persons who, living elsewhere in the town, have their daily work on the island, 3 in men occupied about shipping in the North Dock, and only 2 cases occur among the whole population of the large town who had no direct connection with the island. But even these two cases occur in persons living within 150 yards of the ship, across the dock, and living in the next house but one to the cottage where the man died who was taken from the vessel on her arrival.*

"Among the cases of yellow fever recorded in the following pages will be found one of much interest, where a vessel lying close to the Hecla while her cargo was discharging left Swansea for a neighbouring port, and there lost two of her crew of four, one of them certainly from yellow fever.

"But it is remarkable that the Bristol and Swansea pilots, the five seamen who helped to bring the ship into harbour, the custom-house officers and men, and almost all the men employed in discharging the Hecla's cargo, escaped an attack of the fever (the after history of most of them being known), although they had much more direct dealing with the ship than the persons who were attacked. For this circumstance no explanation can yet be offered, but it is one which has many parallels in etiological research, and cannot be held to constitute a material difficulty in affirming the connection between the Hecla and the fever on shore.

"During this period an almost tropical heat prevailed at Swansea, and no rain fell. Probably the climatic conditions that foster yellow fever in the West Indies have never been better imitated in Great Britain. The locality, too, where the cases occurred, a low-lying alluvial island at the mouth of a river, is such as is particularly favorable to the disease in its native latitudes.

"Granting the original connection of the disease with the Hecla, it must also be granted that in the great majority of instances the disease occurred in the individual without communication with any previous sufferer. But how does the evidence stand about its having been communicated in any case or cases by personal contagion? On the one side, in favour of such contagion are to be alleged the facts (a) that in

* "Of the 7 doubtful cases 5 resided on the island, 1 was occupied in a vessel alongside the Hecla, and the remaining 1 (1 of the most questionable of all the doubtful cases) alone had nothing to do with the docks or island."

one house on the island five persons of one family (Mahoney) were attacked in succession with more or less positive yellow fever, and that Mrs. Williams had had the opportunity of personal contagion from the corpse of a neighbour; (*b*) that in another house, at a distance from the island, where a man (Colwell) died of the fever, another man (Jones) was also attacked; (*c*) that two cases (Hickey) originated in the immediate proximity of the house where the originally imported case (Saunders) died; (*d*) that one of the medical men, Dr. Griffiths, had an attack simulating yellow fever after attendance on a case. But to each these considerations there is a drawback that greatly destroys their apparent value, for (*a*) each of the Mahoneys and Mrs. Williams were exposed by residence near the ship to the same direct infection from her; (*b*) Jones, as well as his fellow-lodger, had worked on the island at such an interval before as would just make the period of incubation observed in other cases; (*c*) the Hickeys lived within a short distance from the ship, though away from the island, or if they did get the disease from Saunders, being the only people who received the disease from another, the fact that Saunders came direct from the Hecla, and might have brought some of her atmosphere with him, separates this case from all others of apparent personal contagion; and lastly (*d*), Dr. Griffiths' case is weak, inasmuch as his symptoms were in some essential features unlike those of slight cases of yellow fever, and also inasmuch as there was with him no exposure till two days before his attack, a period below the incubation time of the disease as observed in Swansea.

"On the other side the evidence tending to negative personal contagion is about as strong as such evidence can by its nature ever be. Persons exposed to the fever-producing influences about the docks lay sick of yellow fever in various parts of the town—Norman at Clifton Row, Bowen at Fynone Street, Margaret Williams at Gower Place, Jesse at Greenfield Street, Thomas at Sketty, Lilley at Clifton Hill, Colwell and Jones (for it is fair to quote them on this side the question) at Lower Rodney Street, Wilkins at Bethesda Terrace, Mrs. Wilson at Mansell Street, and Nathaniel Williams at Powell Street. Moreover, Slocum died at Llanelly, and Stapleton was sick at Frampton-on-Severn, and no extension of the fever occurred at either of those places. Thus, that there were twelve centres from whence the disease, if it had been communicable from person to person, had the opportunity of spreading, and many of these localities were perfectly adapted for the spread of contagious diseases; yet, in no single instance out of all these did any person (whose business did not lead them to the infected neighbourhood of the docks) get yellow fever or any disease at all simulating it. The conclusion, then, appears indisputable that, if the fever was communicable at all by personal contagion, it was so only in an extremely feeble degree. If it had behaved like any of the more contagious fevers, such as smallpox, measles, typhus, or relaxing fever, it is quite certain that no such account as this could be given. The contrary belief, that infection was received by each person severally, direct from the Hecla, is further rendered very strong by the fact that after the removal of the Hecla (and allowing for the incubation period in persons already infected) no fresh attack whatever occurred on the island or else-

where, although the same climatic conditions persisted for some time after."

[Yellow fever again visited this country in 1866, but the accounts so far published are not sufficiently clear to be worth presenting in this 'Year-Book.' A paper has, however, been recently read by Dr. Gavin Milroy, at the Epidemiological Society, but unfortunately not yet published, which traces in a very accurate manner the history of the infected ships, and it is only right to mention that, upon the question as to *personal contagion* in yellow fever, the latest observations appear to bear out the negative opinion as favoured by Dr. Buchanan in the above-cited report.]

Diphtheria.

Bubola* inoculated diphtheritic matter in 29 healthy children, of whom 13 belonged to families where diphtheria was already present, and 14 lived at a short distance; and he states that none of the children so treated were attacked with the disease. His method of proceeding was this:—A piece of false membrane having been removed from the pharynx, the diphtheritic matter was inserted by means of a lancet in one or two places in each arm, as in vaccination. After a period of from 16 to 20 hours there appeared at the punctures a small reddish elevation, which sometimes diminished gradually, and disappeared in two or three days without leaving any trace. Most frequently, the elevation became hard, increased rapidly in size, and in a few hours became filled with a greyish matter, and surrounded by an inflammatory areola. In some cases bullæ of the size of a franc were formed at the points of puncture, and, when opened, gave exit to a slightly corrosive serous liquid, leaving a greyish layer at the base. Cicatrisation was generally complete in eight or ten days; in some rare instances there was left a pale ulcer, of lardaceous aspect, and yielding fetid pus. The application of nitrate of silver, however, produced a cure in a few days.

Vaccination.

M. Chauveau† has made some experiments on the production of natural vaccinia. He injected the contents of three tubes of excellent vaccine matter into the jugular vein of a horse, and the same into that of a mule. At the end of a month no result had been produced, and there was a similar want of result after injection of vaccine matter into the carotid and facial arteries. Chauveau then determined to inject a lymphatic vessel having a gland in its course, and accordingly performed the experiment on a horse. At the end of 11 days there was a magnificent vaccine eruption on the nose and lips, and, on the 14th day, in the fold of the pastern of the hind limbs. The liquid furnished by the pustules being inoculated into four animals of the bovine species, produced in all a beautiful vaccine eruption, which remained quite local. On being inoculated by four punctures into an infant, it produced a single small pustule, which was slowly developed, and the matter of

* 'Gaz. Med. Italiana;' 'Gaz. Méd. de Paris,' 50, 1865.

† 'Gaz. Méd.,' 17, 1866.

which, transmitted to a second child, produced in each arm three pustules, which also were developed slowly, but became remarkably large. Some of the matter was also injected into the lymphatics in the neck of a mare. Eight days afterwards there was a superb pustular eruption in the mammary and inguinal regions, and on other parts of the body, the matter from which was successfully transmitted to an ox and a child.

In some remarks on the conditions which regulate the development of primary vaccinia, M. Chauveau* sums up his memoir in the following conclusions:—1. Vaccinia in the horse must be divided into natural and spontaneous, and artificial—accidental or experimental. 2. Natural or spontaneous vaccinia shows itself on the skin of horses in the form of a general pustular eruption; but often is almost confined to a small extent of surface, as the naso-labial region or the heel. 3. Artificial or accidental vaccination, the result of the inoculation of virus from animals having natural vaccinia, presents itself in two forms, local and general. 4. The local form of artificial vaccinia arises from the insertion of vaccine matter in the surface or in the superficial layers of the dermis, and its germination, without true incubation, on the spot. Hitherto it has not been seen in the horse to be accompanied with a secondary eruption on other parts of the body; but, still, it has a general influence on the system. 5. The characters of the general form of artificial vaccinia are completely identical with those of natural vaccinia or horse-pox. 6. The general form is never attended with the development of signs of vaccination at the points where the matter has been inserted, and the eruption does not appear until after an incubation of 8 days at least. 7. For the development of general vaccinia, the inoculated virus must enter the system without passing through the skin. 8. This is verified by—(a) the injection of vaccine matter into the lymphatics; (b) its injection into the blood-vessels; (c) by introducing it into the circulation by an absorbent surface other than the external integument. 9. The development of general vaccine is independent of the quantity of virus used, provided that quantity be appreciable. 10. The source of the virus is equally indifferent; general vaccinia may be produced with matter derived from the horse, from the cow, or from man. 11. The sex of the animal has no influence in the development of general vaccinia. 12. Age, on the contrary, appears to have a marked influence. 13. The local germination of vaccinia, in cases of cutaneous inoculation, does but imply a want of general absorption of the virus. In spite of its special affinity for the skin, it enters the circulation, and, if a general eruption be not produced at the same time with the local one, it is probably because, at the time when it should appear (the 8th day, or sooner) the skin has become insusceptible of developing an eruption. 14. If this explanation be correct, the want of power of cutaneous inoculation to produce general vaccinia cannot be regarded as absolute. 15. As the comparison of natural or spontaneous with artificial horse-pox reveals no essentially different characters between them, speciality in the mode of manifestation cannot be taken as proof of the spontaneous origin of the former. 16. This community of character furnishes, not a direct demonstration, but a well-grounded probability, of identity of origin

* 'Gaz. Méd.,' 37, 1866.

between natural and artificial vaccinia. It is no more difficult to admit the origin of the so-called natural horse-pox from the introduction by the lungs into the circulation of particles of vaccine matter floating in the air, than to recognise the production of general horse-pox by artificial introduction of the virus into the vessels.

M. Bousquet,* at the meeting of the Academy of Medicine on April 10, 1866, read a long memoir on vaccination, addressing himself to two principal subjects—the communication of syphilis by vaccination, and retro-vaccination.

He denies that syphilis may be communicated by vaccination, otherwise than accidentally; and as to retro-vaccination, he first defines it to be, not vaccination from a spontaneous eruption on the cow (natural cow-pox), but from an animal itself artificially vaccinated. When, he says, there has appeared to be a necessity for renewing vaccine matter, persons have attempted to vaccinate cows and have failed; he has also attempted to vaccinate heifers, but without success. Instead of being firm and distinct, the pustules were small and poor; their size, the subcutaneous congestion, and the areola, were all at the minimum; and the pustules, though slow in appearing, ran through their course rapidly. Nor was the matter increased in efficacy; it was neither more nor less powerful than that which had been inserted.

Bousquet also states that he instituted an experiment by vaccinating two series of children — one strong, the other weakly — always vaccinating the strong from the strong, and the weakly from the weakly. In the former he did not find the matter sensibly improved in quality, nor was it remarkably degenerated in the latter. Admitting that vaccine matter does undergo deterioration, he says that there is a point at which deterioration stops. If it were not so, a time would necessarily come when the matter would be altogether incapable of producing a pustule; but this has never yet been observed.

[See also an exhaustive article on vaccination by Dr. Seaton, in 'Reynolds' System of Medicine,' i, 1866.]

Diabetes.

M. Mialhe† holds that the secreting process is under the influence of the nervous system, and that secretion is not merely, or even chiefly, a process of simple elimination. Applying this view to the explanation of saccharine diabetes, he says that he had hitherto believed that the disease was due to a deficient alkalinity of the blood, preventing the complete destruction of the glucose. Now, however, while he still maintains that it is by means of the alkalies of the blood that glucose and its congeners are decomposed, he believes with Cl. Bernard that the primary cause of diabetes lies, not entirely in an abnormal state of the blood, but in an essentially nervous disorder. While, however, Bernard believes that the pneumogastric nerve is at fault, Mialhe considers that there is a general disorder of the nervous system, and that diabetes is an affection of all the nerves which preside over the secretion.

* 'Gaz. Méd.,' 15, 1866.

† Ibid., 18, 1866.

M. Guyot-Dannecy* recommends citrate of soda, in daily doses of half a drachm to a drachm, as a remedy in diabetes. It has been shown by analysis that sugar disappears from the urine when this salt is used with the food instead of common salt. It is also known, since the researches of Wöhler, that the alkaline salts of organic acids, when given in doses too small to produce purgative effects, are absorbed, and, their acid being burned up in the respiratory process, are eliminated by the urine as carbonates. Hence citrate of soda may, without interfering with the gastric acid in the same way as alkaline carbonates, place the system under the influence of an alkaline carbonate, which is indispensable to the interstitial combustion of the glucose of the food. The efficacy of this remedy, and its superiority to the prolonged administration of bicarbonate of soda, have to be proved by clinical experience.

Dr. Buttura† relates a case of saccharine diabetes of ten years' duration, in which, after employing various remedies unsuccessfully, he applied a seton to the neck. As suppuration became established the sugar disappeared from the urine, the patient regained strength, and ultimately made a perfect recovery, remaining in good health eight months after the removal of the seton.

Acute Rheumatism.

MM. Ollivier (A.) and Ranvier (L.)‡ relate a case of acute rheumatism, and summarise, in their remarks on it, the results of their researches into the pathological changes produced in this disease.

They observe that rheumatism does not produce merely vascular changes in the joints, but also gives rise to new formations. These, in their simplest stage, consist of a large number of cartilage-cells and corpuscles, which either remain or disappear in some way not yet understood. This condition may be found in parts which to the naked eye appear sound. In other cases there is more or less deep ulceration, attended with an abundant secretion of purulent fluid in the interior of the joint, and with an exudation in the form of flocks or false membranes, consisting largely of cells. These changes take place very rapidly. In the case described by the authors death occurred on the ninth day of the disease.

When rheumatism affects the head the disappearance of pain from the joints when the cerebral symptoms set in has received various interpretations. We must, Ollivier and Ranvier observe, distinguish the mere disappearance of pain from the disappearance of pain, swelling, and redness. We must ascertain whether important lesions do not remain in the joints before we conclude that there has been a true metastasis to the brain. In fact, although the pain disappears when cerebral symptoms appear, it is not so with the other lesions. In the case related by the authors the pains in the joints disappeared soon after the brain became affected, and yet there were found at the autopsy congestion of the synovial membrane and effusion into the joint capable of producing pain. It is to the nervous system that we must look for an

* 'Bull. de Thérap.,' April 15, 1866.

† 'Gaz. Méd.,' 27, 1865.

‡ 'Comptes rendus de la Soc. de Biol.,' 'Gaz. Méd.,' 12, 1866.

explanation of the phenomenon. Patients in cerebral rheumatism have been seen to walk on and move joints which were profoundly diseased, in the same way as those suffering from traumatic delirium sometimes remove the apparatus from fractured limbs, and use them as if they had received no injury.

The changes which the membranes of the brain undergo in rheumatism appear to be of the same kind as those in the joints. In very rare cases Ollivier and Ranvier have found a purulent fluid in the cavity of the arachnoid and in the meshes of the pia mater; in others, much more numerous, there have only been traces of intense congestion, characterised by dilatations of the vessels.

Dr. Thomas Stevenson* writes on the urine in acute rheumatism. The urine of eight different and selected patients was most carefully examined, and the writer comes to the following conclusions:—1. In acute rheumatism, when the excretion of solid materials in the urine is large, the patient makes, other things being equal, a rapid recovery; on the other hand, in lingering cases the excretion of solids is usually small. 2. As in this disease the urine is invariably scanty in bulk, but generally (from this cause only) of high density, a useful guide to the progress of the case may probably be found by diluting the urine to the normal bulk, and then ascertaining its specific gravity. According as it is now of high or of low density will the progress of the disease probably be favorable or unfavorable. 3. Though the excretion of urea is usually greater during the height of the disease than during convalescence, this is not inevitably the case; the reverse sometimes occurs. Though the excretion of urea is greater during the disease than during the early stage of recovery, the urea in the former stage seldom very much exceeds in amount the normal physiological excretion. 4. The uric acid is always much increased while the disease continues. 5. The phosphoric acid is generally in greater amount during the progress of the disease than during recovery, but the quantity of this substance rarely much exceeds the quantity secreted in health. 6. The excretion of sulphuric acid is generally increased, and often largely. In one instance more was excreted during the recovery than during the acute stage of the disease. The amount of this substance secreted is variable.

M. Bouchut,† from his experience at the Children's Hospital in Paris, believes that articular rheumatism is more common in children than is generally supposed. It may be either acute or chronic, and the acute form may effect one or many joints. There are also scrofulous and scarlatinal rheumatisms, which are peculiar to children, doubtless in consequence of the much greater frequency of scrofula and scarlet fever among them than among adults. In a large proportion of cases the rheumatism is subacute. The general course of the disease is the same as in the adult. As complications, Bouchut has met with pneumonia, pleurisy, endocarditis, and, with the greatest frequency, pericarditis. Rheumatic meningitis he has never observed in children. Organic lesions of the heart are less frequent in children than in

* 'Guy's Hosp. Rep.,' 1866.

† 'Union Méd.,' 100, 1865.

adults; but Bouchut has met with some instances, one of which he mentions as having occurred in a child 11 years old, who was removed from the hospital in the last stage of heart-disease following rheumatism. Even in very advanced heart-disease anasarca connected with valvular lesions is rare; a few traces only are found in the ankles and face, and in the rest of the body.

In the treatment Bouchut does not employ local or general blood-letting unless visceral complications demand it. He has tried quinine, but prefers veratrine in gradually increasing doses. Under its use the pulse falls, and the joint affection disappears in from three to five days, rarely lasting longer. When visceral complications exist, leeches and various revulsives must be used. In chronic rheumatism in children he employs tincture of colchicum, veratrine, sulphurous waters, vapour baths, or iodide of potassium. The last-mentioned medicine he uses in doses of from four to fifteen grains daily.

Acetonæmia.

Acetonæmia is defined by Cantani* as a diseased condition arising from the spontaneous development of acetone in the system. Acetone, which is developed by the fermentation of organic matters, especially grape sugar, is readily formed in persons labouring under gastric catarrh; there is, in fact, an abundant secretion of mucus, which undergoes change and gives rise to this product. The acetone is furnished by the organs whose veins open into the ascending cava, especially those of the liver, stomach, and intestines. Acetonæmia is developed chiefly in the following conditions:—1. Irregularities of diet and alcoholic excesses. 2. Obstinate constipation, leading to the decomposition of fæces in the intestine. 3. Certain febrile diseases, especially smallpox, scarlet fever, and typhoid fever. 4. Diabetes and organic diseases of the stomach, such as cancer of the pylorus or cardia, or diffuse cancer of the walls of the organ. 5. Inanition. Post-mortem examination shows no particular change; but the blood, muscles, and viscera, exhale a strong odour of acetone. Acetone resembles ether and chloroform in its action. Existing in small quantity in the venous blood, it produces no severe symptoms, although it may be recognised in the breath by its special odour. On the other hand, its presence in arterial blood produces marked disease. One of the first symptoms is a certain degree of excitement; and when the acetone has reached the nervous centres depression sets in, and increases until death supervenes. Muscular contractility, electro-muscular sensibility, and cutaneous sensibility, are suspended, in consequence, Cantani believes, of the poisonous action of the acetone on the central and peripheric portions of the nervous system. Blisters and sinapisms, applied to the skin, produce their effect very slowly. Respiration is weakened; there is almost complete aphonia; the pupils are contracted and fixed; there is retention of urine, and nearly all the secretions are arrested; the abdomen is tympanitic; and the cutaneous perspiration is increased, and, with the breath, exhales a very penetrating odour. The actions of the heart and

* 'Il Morgagni,' 'Gaz. Méd.,' vi, 1866.

the arterial pulsations are lessened; but towards the close of life the pulsations and the temperature increase in consequence of paralysis of the vaso-motor nerves. The duration of the disease varies from a few hours to several days. It is sometimes fatal, but generally ends in recovery. The treatment consists in preventing fermentation, promoting the secretions, and antagonising the causes which have been enumerated. Acetone, when formed in the organism, must be eliminated by stimulants or purgatives. Regard must be had to the various symptoms as they occur, and the bladder must be emptied.

Alcoholism.

In a paper read before the Academy of Medicine on July 4, 1865, M. Lancereaux* describes the structural lesions arising from the prolonged abuse of alcoholic liquors as being divisible into two classes. In the first the connective tissue is affected; in the second, there is a modification—granulo-fatty degeneration—of the proper tissue of organs.

The changes in the connective tissue are chiefly met with in the liver, brain, kidneys, and serous membranes, but may be found in most other organs. There is at first a manifest injection, and numerous nuclei grouped in lozenge-shaped spaces appear along the course of the small vessels, especially in their external coats. At a later period cells and fibres are developed, and constitute a network, which contracts, so as to impress on each parenchymatous organ a physiognomy almost always identical and altogether special. The condition of the liver described as cirrhosis, the characters of which have been well described by English writers, presents a model example of this change. This organ is at first increased in size; soon, however, the new tissue contracts and presses on the acini, so that the liver diminishes in volume, and presents on its surface or on section, not only a certain amount of induration, but also a finely granular appearance, which is quite pathognomonic. M. Lancereaux has met with this condition in thirty-five cases; its characters have been always the same, differing only in degree according to the stage reached. A very analogous change may occur in the brain; this gradually diminishes in volume, and loses colour; and the convolutions, especially those on the upper surface, become atrophied. The cerebellum and medulla frequently undergo similar changes. The arachnoid and pia mater are generally at the same time infiltrated with serum, thickened, opaque, scattered with whitish patches or points, and often coloured by hæmatin. The kidneys in some cases, like the liver, present a grained or uniformly granular surface, an increased consistency, and notable atrophy. Magnus Huss has described a lesion of the lungs under the name of chronic pneumonia; but M. Lancereaux has not been able to meet with an instance of it. The mucous membrane of the alimentary canal, being most directly influenced, is very often affected, but in certain parts only—the stomach and the cæcum. The mucous membrane of the stomach presents a very rich vascularity, disposed in scattered patches, mostly

* 'Bull. de l'Académie de Méd.,' xxxi.

near the cardia and over the small curvature. At the level of these patches, principally at the summit of the folds of the membrane, are sometimes seen hæmorrhagic clots, or elongated erosions, with a large amount of the colouring matter of the blood at their bases. At a later period this membrane, scattered with black or pigmentary spots produced by altered blood-corpuscles, becomes firm and indurated, as well as the subjacent connective tissue. Softening is rare, but M. Lancereaux has seen an example. Injection and hæmorrhagic points constitute the change most generally observed in the mucous membrane of the larynx and bronchi. The vessels which are in the beginning charged with the products of absorption—the portal vein and pulmonary artery—are affected by the deposit between their coats, or even on their anterior, of membranous productions, which may narrow or even obliterate them. Most of the cases of adhesive inflammation of the portal vein have been observed in drunkards. The serous or fibro-serous membranes—the peritoneum, pleura, and dura mater—have been found to present the lesions characterised by the presence of a new formation, consisting of fibres of connective tissue and fragile vessels.

The changes belonging to the second category are characterised by the presence of protein or fatty granulations in the midst of the proper organic elements. In these conditions these elements swell up, and are often at last destroyed; this is what occurs to the hepatic cells, to the renal epithelium, to the cells of the cerebrum and cerebellum, and even the capillaries of the encephalon. The liver is the organ most frequently affected. It increases in size, and tends to assume a cubic form, which distinguishes it from the fatty liver met with in pulmonary consumption, and where the organ, although sometimes excessively enlarged, preserves its original shape. The kidneys also become enlarged and cubical in form. The cells of the tubules are filled with fatty granules, and give the cortical substance a uniform yellow tint; besides which, in some cases, there is a reddish dotting, due to injection of the Malpighian glomeruli. The organ retains a smooth surface, and never becomes atrophied or granular. The pancreas, the salivary glands, the glands of the stomach, the epithelium of the bronchial tubules, and even of the seminal canals, do not escape this special degeneration. The heart becomes loaded with fat at the base, and is flaccid, soft, and of a bronzed-yellow colour. The muscular tissue gradually loses its striæ, and becomes granular; and the heart undergoes dilatation and hypertrophy. The bones and cartilages also undergo fatty degeneration.

An important circumstance in regard to the diagnosis of these lesions is their simultaneous occurrence, and their habitual coexistence with deposits of fat in the subcutaneous cellular tissue, mesentery, and epiploon.

Each of these anatomical lesions is attended by a corresponding group of functional disorders, the aggregate of which render alcoholism one of the most distinct pathological unities, one in which, consequently, a special treatment may be tried.

The two kinds of change above described do not occur with equal frequency. While fatty degeneration may be said to be constant in the

liver, M. Lancereaux has found chronic inflammation of this organ in only in 35 cases among about 130. He does not attempt to explain this difference; but remarks that most of the cases of chronic inflammation have occurred in persons subjected to hard labour, while fatty degeneration was almost always met with in those of sedentary habits. We do not know how the lesions are produced; but M. Lancereaux thinks that the one first described—the chronic inflammation—is due to the direct action of alcohol, and resembles closely the effect produced on the tunica vaginalis by the injection of alcoholic fluids. This idea he believes to be supported by the fact that the portal vein, the liver, and the pulmonary artery—the parts most exposed to the influence of the alcohol—are those most frequently affected. The fatty degeneration he believes to be connected with an impairment of nutrition and a diminished elimination of carbonic acid.

M. Lancereaux draws a comparison between the degeneration produced by alcohol and that which attends old age. In both there are progressive atrophy of the encephalon, increase of the cerebro-spinal fluid, granular and fatty changes in the small vessels, in the muscular structure of the heart, and in most of the elementary tissues, dilatation of the pulmonary vesicles, ossification of the costal cartilages, and thinning of the substance of the bones, which is replaced by fatty matters. It may without exaggeration be asserted that, both physiologically and pathologically, alcoholism produces premature old age. In the course of most acute diseases the modifications observed in the old man and in the drunkard differ but little. For instance, a young man, the subject of chronic alcoholism, has pneumonia. The disease presents the characters and the severity of the pneumonia of the aged. It attacks the apices, and has a tendency to form abscess; it is attended by a certain amount of restlessness, delirium, hallucination, and ataxic or adynamic symptoms, and frequently ends in death from asthenia. These remarks are equally applicable to most other diseases, and indicate that the acute diseases which occur in the subjects of chronic alcoholism, as well as in the aged, present special indications of treatment.

On the diagnosis of chronic alcoholism, see Anstie, 'Lancet,' i, 1866, p. 399.

Constitutional Syphilis.

Prof. Jaksch* writes on syphilitic paralyses in general, and especially hemiplegia and paraplegia.

Of syphilitic hemiplegia Jaksch has collected 52 cases, 12 of which were in his own practice. He remarks that among the symptoms commonly classed under the term hemiplegia no notice has been taken of affections of the muscles of inspiration and expiration, and the other muscles of the trunk. Yet this is a most important point, since palsy of the respiratory muscles may well be the cause of rapidly fatal mischief, by producing a deadly form of pneumonia usually called "hypostatic," more fitly "paralytic." In the author's 52 cases he has not found one in which paralysis of the muscles of the trunk had been

* 'Prag. Med. Wochensh.,' 44—52, 1865; 'Schmidt's Jahrb.,' 1865.

satisfactorily made out. In the majority of instances an indurated chancre was discovered to have been the primary mischief, but in a third of the cases no sufficiently accurate testimony on this point could be obtained. The length of time from the primary disease to the appearance of paralytic symptoms varied from 5 or 10 months to 18 years, but in most cases it was from 3 to 10 years. As a rule, the occurrence of paralysis was preceded by various other constitutional symptoms of syphilis, especially affections of the skin, mucous membranes, glands, and bones; and then either persisted at the time of occurrence of the paralysis, or were redeveloped during the hemiplegic attack, or had been already cured by the use of mercury or iodine. Among the 52 cases there were only 9 which had had no treatment previous to the hemiplegia, all the rest had taken courses of mercurials or preparations of iodine, most of them repeatedly; 29 of the patients were cured of the paralysis, 6 were improved, 5 remained uncured, and 12 died, either directly from the brain-disease, or from bed-sores, or from other intercurrent diseases. The pathological appearances in the brain were—in 6 instances softening in the cerebrum (sometimes with and sometimes without gummy tumours), in 1 case softening in the cerebellum, in 3 cases abscess of the brain, in 2 atrophy of the white substance. The author believes that the cases in which syphilitic disease proves fatal (although it cannot be doubted that such occur) are very rare. Softening of the brain, the most frequent pathological condition, may be caused in various ways. In the first place, *gummy deposits*, when they exist, may excite inflammatory action in surrounding tissues; it would be wrong, however, to suppose that this result always follows. Local softenings of the brain are found in cases where no gummy tumours are present. It has been urged that the deposits may have disappeared, but Jaksch can see no proof of this, especially as an undiscovered embolus of a cerebral artery, competent to produce softening, may have been easily overlooked. A third cause of softening is suggested, viz. that gummy deposits in the pia mater pressing upon the brain-cortex may produce atrophy and induration, a fact which is borne out by observation. Abscess of the brain may also be brought about by various causes. Caries or necrosis of the cranial bones may produce suppurative inflammation of the membranes and of the brain itself. More frequently, syphilitic abscess of the brain is a consequence of inflammation of tissues surrounding a gummy deposit, or a thrombosis, or it may result directly from purulent transformation of a syphilitic deposit. Atrophy of the larger portions of the brain may be chiefly referred to *ramollissement* and obliteration of the vessels. The *diagnosis* of syphilitic hemiplegia is usually not difficult. The specific symptoms which precede usually also accompany and follow it, so that both the invasion and the development of the paralysis present peculiarities of great value for diagnostic purposes. The *prognosis* of syphilitic hemiplegia is usually more favorable than that of other varieties; for the disease can be recognised betimes, and judiciously treated. Moreover, cases have been observed in which a cure has been obtained (by mercury or iodine) even after paralytic symptoms of two years' standing. But it is easy, from considerations of morbid anatomy,

to understand that some cases must be hopeless; *e.g.* thrombosis or obliteration of a large cerebral artery has, perhaps, caused extensive *ramollissement* and hemiplegia, an affection which must be equally serious whatever its cause may have been. The following are the special points of prognosis:—1. Age. Young subjects are the most easily and frequently cured. 2. Strong and healthy looking patients are less likely than more cachectic ones to suffer from secondary deposits in the liver, the kidneys, &c. 3. Repeated infections of syphilis, and frequent and severe courses of treatment, render the cure of a subsequent paralysis more difficult. *Rapid and quasi-apoplectic* attacks, and those in which the paralysis is extensive and profound, are of worse prognosis than those in which its development is gradual and slow. 5. In the latter kind, however, the prognosis remains uncertain where the palsy has lasted long, *e.g.* for several years. 6. The combination of mental disturbance and convulsive attacks with the hemiplegia is ominous, as indicating, probably, extensive disease, not only of the brain, but of its membranes. The author speaks hopefully of the results of treatment. Either mercury or iodine was the remedy used in all the cases (except 1) which were cured or improved. Besides the *paralytic* affections which may result from syphilitic brain disease, certain *mental* affections are sometimes observed. Jaksch reckons three groups of cases:—1. General paralysis, with mental symptoms like those of the disease commonly known by this name. 2. Loss of muscular *energy*, universally, without any affection of intellectual activity. 3. Palsy of all the extremities, with perfect power of the facial and ocular muscles, &c., and undisturbed mental activity. In the first form post-mortem examination shows especially either extensive softening of the cortical substance or else atrophy of the same, with reticulated fibrous adhesions to the membranes. In some cases there was softening, with or without gummy deposits, partly in the anterior lobes, and partly in the central ganglia; in 1 case atrophy of the white substance of the hemisphere. In a case of the second variety there was softening of the pons, and thickly scattered deposits in the arachnoid of the brain and cord; in a case of the third variety there was softening of the cervical and lumbar portions of the cord, and no brain lesion. The age of the patients ranged from 23 to 58 years; only 5 were females. As a rule, the paralytic symptoms were only developed after several years' existence of constitutional syphilis. Only 5 cases were cured, and 1 improved.

Finally, Jaksch notices that *diabetes* is an occasional result of syphilis of the brain. The author thinks that the frequent mention, by certain authors, of cures of diabetes by mercury can only be explained in this way. He thinks that the syphilitic process sometimes affects the floor of the fourth ventricle, and produces symptomatic diabetes, equivalent to that which was artificially produced by Bernard in his well-known experiments.

Dr. Tanturri* recognises two forms of acne, the glandular and the follicular, and says that constitutional syphilis may manifest itself in

* 'Il Morgagni,' and 'Gaz. Méd. de Paris,' Feb. 24, 1866.

either of them. In the *glandular syphilitic acne* the inflammation attacks the epithelium, the proper wall of the sebaceous gland, and the neighbouring connective tissue. It differs from impetigo or eczema impetiginodes in the circumstance that in the latter affection the inflammation is limited to the epithelium of the gland, and yellowish, friable, shining crusts are formed on the surface of the skin. These crusts contain a large amount of nucleated epithelium, like that which normally exists in the sebaceous glands, granular epithelial cells, pus-cells, and fatty matter. These elements are found in small quantity in syphilitic glandular acne; but the disease affects the gland and the surrounding dermis more deeply. It may be said that impetigo is characterised by a catarrhal inflammation, and syphilitic acne by a parenchymatous inflammation. Impetigo, Tantarri says, is not communicable by inoculation; but many experiments have shown that syphilis may be communicated to healthy subjects by the inoculation of the purulent contents of syphilitic acne. In glandular syphilitic acne there may be recognised a stage of eruption or suppuration, one of retrogression or atrophy, and one of desquamation. Glandular syphilitic acne is generally one of the first constitutional manifestations of syphilis. Its development is slow and gradual; in some cases, however, it may be rapid—as it were acute, and is then accompanied with more or less fever. At the same time with the acute acne we see erythema, moist papules, and other signs of recent constitutional infection. The chronic form is pretty frequently accompanied by ecthyma, gummata, chronic glandular swellings, periostitis, &c. Acute acne is one of the most obstinate symptoms of constitutional syphilis; the chronic is still more obstinate, especially if the skin has been affected by previous diseases. Glandular acne, according to Zeissl, is never met with in newly born syphilitic children; but Diday has described it without questioning its occurrence at this early age.

The diagnostic characters of syphilitic acne are thus described by Tantarri: — *a. Acute syphilitic acne.* In the eruptive period the disease is seated on the trunk and the upper and lower limbs; the pustules are acuminate, with a hard base; the suppuration is central and superficial, and the pus has a tendency to dry up. In the suppurative stage syphilitic acne presents pustules having a large hard base, with a central depression, covered by a small adherent crust. In its third stage syphilitic acne is characterised by small hemispherical projections, desquamating at the circumference and having concrete pus in the centre. In the fourth stage syphilitic acne presents small hemispherical projections, with an irregular surface; superficial cicatrices, with little pigment, and an abundance of fine scales.

b. Chronic syphilitic acne is localised on the face, neck, trunk, and upper and lower limbs. It is characterised by small pustules, with a slightly projecting base, which are developed slowly, and suppurate only at the centre.

Follicular acne presents the characters of a catarrhal inflammation limited to that part of the follicles which traverses the epidermis; that is, the portion lying above the opening of the sebaceous glands. The inflammation of that part of the follicle which is seated in the

dermis or on the subcutaneous cellular tissue is, on the other hand, parenchymatous; because the wall of the follicle and the neighbouring connective tissue are equally affected, and participate alike in the formation of pus or of new connective tissue. When diffuse, follicular acne may, as well as the glandular form, be accompanied by more or less intense fever. It is generally an early symptom of constitutional syphilis; but Tantarri has seen it forming a kind of transition between the development of gummata and visceral lesions. The progress of follicular acne is slow, especially if left to itself; its duration is very long. If, at the period of desquamation, the excessive development of epidermic cells continue for a long time, a condition resembling ichthyosis is produced. Follicular acne may coincide with all the tegumentary lesions of the first period of syphilis, and especially with iritis. The eruption may appear on any part of the body except the face; it consists of small pustules with a slightly projecting base, surrounded by a rose-coloured areola; the centre is yellowish, umbilicated, and traversed by a hair.

M. Ranvier* relates the case of a woman, aged 28, who was admitted into La Pitié Hospital with an ulcer of the leg, and afterwards treated for neuralgic pain in the left supraorbital region. Here and in the sternum was severe and constant pain, not perceptibly more intense at night, but increased by pressure. The supraorbital pain was limited to the external angle of the orbit, and radiated slightly over the temple and forehead, and into the orbit. The eye was normal. The sternal pain was in the situation of the third portion of the bone, and at the insertion of the cartilage of the fourth rib there was a slight but appreciable enlargement, and the skin had a somewhat violet tint. The appetite was good, and the breathing normal, but impeded by the pain produced by the respiratory movements. For some days the pain increased at night; and, in a short time, severe pain set in over the left shoulder, and at the same time the anterior part of the wall of the chest on the left side became covered with a well-marked venous network. The pectoralis major became contracted. There was œdema of the upper eyelid, with internal strabismus and severe photophobia; the patient also lost appetite, and had slight diarrhœa and some bilious vomiting. Little or no information regarding syphilis could be obtained from the patient; but there was some apparent trace of the disease on the left labium majus.

The patient died of cholera; and in making a post-mortem examination, 24 hours after death, the brain, lungs, and heart, were found healthy; the digestive canal presented the ordinary cholera lesions; the kidneys were not examined; the liver presented, on its convex surface, small smooth cicatrices, slightly depressed, resembling the impressions made by a hard body on wax. The depressions were blackish, small, oval, or somewhat round in shape. No cicatrices were found in the neck of the uterus, which was irregular and softened. The lachrymal gland appeared somewhat enlarged; the bone in this region was reddish, dotted, and uneven. No disease was found in the shoulder-joint. The sternum, at the part mentioned above, presented only a slight enlargement.

* 'Comptes rendus de la Soc. de Biol.,' 1865.

Ranvier describes in full the appearance presented on examination of the liver. On making a section of a gummatous tumour of the size of a hazel-nut, projecting from the surface of the liver, it was found to be composed of a resistant yellowish tissue, furrowed with numerous vascular arborisations. Its outline was not well defined, and it could be easily seen by the naked eye to become gradually incorporated with the hepatic parenchyma. No juice could be obtained by scraping it with a scalpel. By needles it was only broken into small irregular fragments, in which were found small round nuclei; larger nuclei and cells; and round, ovoid, or fusiform bodies, few in some parts, abundant in others. These nuclei and cells were firmly connected by a strong amorphous or fibrillar tissue. After the addition of chromic acid it was seen, with a magnifying power of 75 diameters, that the tumour contained a certain number of small nodules, touching each other at the circumference, but differing in structure, externally and internally. At their centre were accumulated the nuclei and smallest cells, and a large proportion of the amorphous matter, in small irregular masses. At the periphery the structure became more fibrillar, so that on the outside the lobules contained tissue in all respects resembling connective tissue. Some of the gummata had undergone cheesy or lardaceous transformation; and here the lobules were distinguished only by groups of fatty granules disposed in circles.

On making sections of the gummata with a portion of the surrounding liver, it was seen that the morbid tissue was united with the hepatic tissue by bands of embryonic connective tissue (cells and embryoplastic nuclei). These bands passed between the lobules of the liver, and were traversed by the terminal ramifications of the hepatic artery and duct, and of the portal vein. The cellular elements of the new growth were insinuated among the hepatic cells; so that at the boundaries of the tumour there were found atrophied globular hepatic cells, filled with yellowish granules interspersed in the new tissue. When the cells were completely atrophied their place was sometimes denoted by the presence of globular and stellate crystals of stearic acid, resulting from the decomposition of the fatty matters formerly contained in the cells.

The excessive formation of connective tissue was not confined to the vicinity of the gummata. In the various portions of the liver which he examined Ranvier found the condition described by Virchow as interstitial syphilitic hepatitis, that is, islets of embryonic tissue between the hepatic lobules. In some parts, also, there was a curious arrangement—the central vein was surrounded by a thick zone of embryonic tissue, sometimes separating it by half a millimètre from the network of hepatic cells.

In the liver, Ranvier observes, we meet with gummata and interstitial hepatitis. The tissue of the former differs from that of the latter only in the extreme smallness of its elements. Like tuberculosis, syphilis imprints on its deposits the character of poverty and smallness, and liability to further degeneration. But as in syphilis the elements are enclosed in a very firm tissue, their degeneration does not, as in tuberculosis, generally produce a diffused cheesy mass, but a resistant

tissue; and as the vessels are not so rapidly obliterated in syphilis as in tuberculosis, syphilitic deposits may be absorbed, while this is only exceptionally observed in tubercle.

The frontal bone and sternum presented a condition rarely observed, which Ranvier proposes to term gummatous osteitis. It is characterised by an enlargement of the vascular and medullary spaces of the bone, and by the filling of these cavities with a substance gelatinous in some parts, lardaceous and cheesy in others. This form of osteitis, Ranvier says, has hitherto been only imperfectly described by Dufour. Virchow says that he has not met with an instance. The gelatinous portions contained small cells in an amorphous or fibrillar substance, and a number of nuclei—*cytoblastions* of Robin. In some parts of the bone these had undergone cheesy transformation; and here there were also fatty granules in various proportions, and also obscure globular masses of crystals of stearic acid.

On the general subject of constitutional syphilis, see J. Hutchinson's article in 'Reynolds's Syst. Medicine,' i, 1866, which includes all the recent information on the subject.

See, also, some very valuable remarks by Dr. Hughlings Jackson "On Syphilitic Disease of the Cerebral Arteries" ('Lancet,' Oct. 27, 1866).

Tuberculosis.

In a note communicated to the Academy of Sciences M. Villemin* says that tuberculosis is the effect of a specific cause, a virus, which, like its congeners, may be propagated in the morbid products to the formation of which it leads by its direct action on the normal elements of the affected tissues. M. Villemin states further that he has established by experiment the fact that this virus, when introduced into a susceptible body, may reproduce itself, and at the same time reproduce the disease of which it is the essential principle.

On March 6 M. Villemin placed two young rabbits, about three weeks old, in a cage, and inserted behind the ear of one of them two small fragments of tubercle and some puriform fluid taken from a cavern in a man who had died of phthisis thirty-three hours previously. On March 30 and April 4 tubercle was again inoculated. At each operation local symptoms were produced. On June 20 both rabbits were killed. In the animal which had been inoculated tubercle was found scattered along the greater curvature of the stomach; there were also tuberculous deposits in the small intestine and in the kidney, and the lungs were full of large tuberculous masses. The other rabbit, which had not been inoculated, but had in other respects been subjected to the same conditions, presented no signs of tubercle.

On July 15 three healthy rabbits, living in an airy situation, and supplied with abundant and varied food, were inoculated with tubercle. The operation was repeated on them on July 22, and at the same time another healthy rabbit, living with the others in the same conditions, was inoculated. In the middle of September the animals were killed. In one there were abundant patches of tubercle of the size of a lentil, projecting on the surface of the lungs, and some miliary granulations.

* 'Gaz. Méd.,' Dec. 16, 1865.

In a second and third there were similar appearances, and one animal had yellowish-white tubercles in the ileo-cæcal appendix. In the fourth rabbit (the last which had been inoculated) there were, chiefly in the left lung, tubercular deposits of the size of a pea, projecting on the surface. There was also a large number of granulations surrounded by a reddish areola of congestion. Several tubercles were in the peritoneal covering of the liver and in the upper portion of the small intestine. While these experiments were being carried on, two other rabbits, living in precisely the same conditions as those which were inoculated, were killed for other purposes, and presented no trace of tubercle. A third rabbit, whose sciatic nerve was divided on July 14, was killed on November 21. There had been prolonged suppuration, with swelling of the tibio-tarsal joint with caries of the os calcis, and the animal had become extremely thin; but there was no tubercle.

In a third series of experiments, commenced on October 2, M. Villemin procured three pairs of rabbits about three months old. Each pair was from the same litter, and from a separate mother. One animal of each pair was inoculated, and each pair was placed in a compartment of a cage. A large vigorous adult rabbit was also inoculated. On November 23 the inoculated rabbit of one pair was found dead. The posterior part of both lungs was congested; and in the congested tissue, principally under the pleura, were very small greyish granulations. The cortical substance of the kidneys contained a large number of cysts filled with transparent fluid. In the other two pairs, killed on November 29, the inoculated rabbits both presented tubercles beneath the pleura. The three rabbits which had not been inoculated presented no trace of tubercle. In the large adult rabbit both lungs were covered with subpleural granulations, the smallest of which were surrounded by areolæ of congestion. There were two or three tubercles projecting on the surface, and the tissue of the lungs contained granulations. Tubercle was also found on the surface and in the tissue of the spleen.

From these experiments M. Villemin arrives at the following conclusions:—1. Tuberculosis is a specific disease. 2. Its cause lies in an inoculable agent. 3. Tubercle is readily inoculable from man to the rabbit. 4. Tuberculosis belongs to the class of toxæmic diseases.

With the object of verifying the results obtained in M. Villemin's experiments, MM. Hérard and Cornil* have performed experiments on seven rabbits about six weeks old. Six of the animals were placed in a large rectangular box, where they could easily move and breathe. The seventh was left at liberty. The latter animal and one of the others were not inoculated. Of the remaining five, two were inoculated solely with the matter of grey semi-transparent or opaque and yellowish tubercular granulations found in the peritoneum and pleura of a phthisical patient. The other two were inoculated with cheesy matter derived from a lung affected with what the authors regard, not as tubercle, but as catarrhal pneumonia, with granular and fatty deposit. The animals were all, except one, killed at the end of two months; but the rabbits of the second category alone presented any signs of disease.

Two of these, which were killed (the third being retained for further experiments), presented an early stage of tubercular disease of the

* 'Gaz. Méd.,' 15, 1865.

lungs, in the form of groups of small, hard, grey, semi-transparent graules, tolerably firm, and composed of an agglomeration of very small spherical nuclei, bound together by granular or fibrous material. These granules exactly resembled those found in man, and also, as was proved by direct comparison, those obtained by M. Villemin in his experiments. In one of these rabbits the lower lobe of the lung was strongly and extensively congested, and the parts in the neighbourhood of the granules contained large epithelial cells undergoing endogenous multiplication, and leucocytes. There was also, on the right side of the neck (the side on which the inoculation was made, a chain of enlarged and yellowish softened lymphatic glands. Their tissue was pulpy and opaque, and they contained the ordinary nuclei and small cells, but generally larger than in the normal state, infiltrated with granules of albuminoid and fatty matter.

See also Vogel, "On the Transferability of Tubercle to Animals," 'Arch. f. Klin. Med.,' ii, 3, p. 364. Gibout, Instances of apparent communication of tuberculosis between human beings, 'Journ. de Méd. de Brux.,' 1866, p. 448.

Trichiniasis.

On this subject we had intended to introduce an analysis of the splendid report of Dr. Thudichum "On the Parasitic Diseases of Animals used for Food" ('Seventh Report of the Med. Officer to the Privy Council'). It is, however, impossible to do any justice to this great work of research by a short abstract, and we can therefore only mention it.

B. DISEASES OF THE NERVOUS SYSTEM.

Mental Diseases.

Dr. Adam Addison* publishes the results of some new researches on the chemical composition of the urine of the insane. The conclusions at which he arrives are as follows:—1. The quantities of the urine, of the chloride of sodium, urea, phosphoric and sulphuric acids, excreted during the course of a maniacal paroxysm occurring in acute mania, epilepsy, general paralysis, dementia, or melancholia, are less than the amounts secreted, in an equal time, in health. 2. In chronic melancholia the quantities of the same substances are reduced below the mean, and sometimes below the minimum, of health. 3. In idiocy, dementia (paralytic and common), the same substances range above and below the normal mean of health; in some cases the amount of phosphoric acid is greater than the mean according to weight, but in the majority of cases it ranges between the minimum and the mean found in healthy adult men.

Dr. R. Boyd† gives an estimate of the size of the head and weight of the brain as observed in 696 cases of insanity. This paper, though not absolutely long, is so condensed that it is impossible to represent its data by an abstract, and, as we cannot insert it entire, we can only call attention to it.

Dr. H. Weber‡ calls attention to a violent maniacal delirium which occasionally breaks out in the decline of acute pyrexial diseases, when

* 'Brit. and For. Med. Rev.,' April, 1865.

† Ibid., Jan., 1865.

‡ Ibid., April, 1865.

the fever has already nearly or quite disappeared and the patient has seemed to be convalescent. He has observed 7 cases—2 occurring after measles, 2 after pneumonia, 2 after typhoid, and 1 after erysipelas. The condition of the brain appears to be one of anæmia, caused chiefly by a transitory change in the capillary circulation, and hence in the nutrition and action of the brain-cells, and produced, perhaps, by a sudden sinking in the heart-power. The prognosis does not seem alarming; all Weber's cases quickly recovered with opiates, wine, nourishment, and rest. Still, it has been recorded by some observers that the mental disorder has become chronic, though Weber has never seen such an occurrence.

On the subject of the relations of chorea to insanity, the paper of M. Thore* is important. He relates two cases in which distinct symptoms of insanity supervened on a chronic attack. The first of these is of great interest, because the chorea itself occurred as a complication of acute articular rheumatism. The patient was a young lady, who experienced an attack of general acute rheumatism, with pleurisy and endocarditis. Coincidentally with the subsidence of the pains she began (twenty-four days from the commencement of the illness) to be affected with choreic movements, chiefly of the left arm and of the face. Two days later, alarming hallucinations of sight, hearing, and feeling, occurred; for two or three days these were very distressing. The mental symptoms and the chorea diminished simultaneously, but the patient remained abstracted and timid for some days. The chorea disappeared about nineteen days after its first occurrence, and only a little weakness remained; a week later the patient was quite well. The other case of Thore was that of a needlewoman, who, ever since an attack of typhus, which she experienced when eleven years old, had been melancholy and depressed. Menstruation had come on at the age of sixteen in a regular manner, although she was chlorotic; but a year afterwards she caught cold at her period, and the menstrual flow was suppressed. Three weeks later choreic movements attacked the lower extremities, and subsequently the upper; they were especially strong on the left side. The chorea and the general agitation increased during the next six weeks, when, at the height of the disorder, visual and auditory hallucinations of a gloomy kind appeared, especially in the evening. There was difficulty of speech, incoherence of ideas, and melancholy, with a tendency to suicide and constant thoughts about it. In the course of another six weeks the chorea, the agitation, the thoughts of suicide, and also the hallucinations, began to leave the patient. Simultaneously with the restoration of the menses the cure was complete.

It has long been established, by the facts recorded by Marcé, Trousseau, Brierre de Boismont, Warin, Brichteau, and also by the histories of the chorea epidemics of the Middle Ages, that various kinds of intellectual and emotional insanity may occur in cases of chorea. The mental disturbances may vary from slight affections of the emotions or the will to hallucination, mania, melancholia, and even imbecility. The two cases recorded by Thore are each interesting as connecting the chorea and the mental affections with an acute disease. In the first case acute rheumatism, which is known to have so frequent

* 'Ann. Med. Psych.,' 1865; 'Schmidt's Jahrb.,' 1865.

a connection with chorea, was actually present at the time of the outbreak of choreic symptoms. Wherever the rheumatic complication is present it is important to distinguish, in any mental aberrations which may occur in this, between mere delirium, with coma or convulsions, symptoms which acute rheumatism alone may easily produce, and distinct hallucinations or other signs of important mental disturbance which are here in question. The second case is interesting on account of the pre-existing state of mental depression which appears to have been left by an attack of *typhus* which happened so long as six years previously, and also because the mental disturbance took the form of *melancholia*, a comparatively rare complication of chorea. The chlorotic condition of the patient, too, is noteworthy.

In a case related by Dr. Lelion the patient, a young man, æt. 19, had previously been healthy, except that since his getting a fright when 7 years of age he had seemed to be of limited mental capacity, and of irascible temper, and that he had been addicted to intoxication. There was no family history of insanity, but his father had suffered from delirium tremens. The illness of the patient commenced with shiverings, followed by pains in the neck; on the third day convulsive movements of the right leg, and soon afterwards the right hand and foot, commenced; and along with these symptoms a furious maniacal delirium set in. The choreic movements afterwards extended to the left limbs; and hallucinations of sight and hearing, sometimes of a terrifying kind, occurred. Morphia produced a slight temporary remission, but the restlessness soon recurred. The cheeks were flushed, the lips dry and much bitten; there was severe thirst, and profuse expectoration of frothy sputa. He remained in much the same state during the following (the fourth) day; no fever or vomiting; no action of the bowels. On the night of the fourth day death occurred, suddenly. On post-mortem examination the pia matter was found intensely injected; the cortical substance was congested, and of a rose-red colour; the white substance of the brain normal.

The general opinion of Thore on the subject of the relationship of chorea to its occasional mental complications is that the latter can hardly depend to any great extent upon it. He thinks that simple chorea is rarely so complicated, and that mental affections are for the most part caused by coincident diseases, *e.g.* rheumatism, typhus, or chlorosis.

Pathology of General Paralysis.

M. Regnard* has been struck with an appearance discovered by Baillarger in examining the brains of certain sufferers from general paralysis. The grey substance of the anterior lobes, when scraped away with the back of a knife, presented ridges of some hard matter which could not be removed in this way, and which were, in fact, *prolongations of the white substance*. This white substance looked yellowish, and was somewhat tough; some of the prolongations were so elastic and firm as to resemble the epiglottis in appearance. Regnard has endeavoured to ascertain with what degree of frequency such

* 'Ann. Méd. Psych.,' Jan. 1865.

an appearance is found in general paralysis. Out of 12 examinations of general paralytics he found it well marked 8 times, indistinct and incomplete 3 times; once it was altogether absent. In 5 of the 8 cases in which the lesion was well marked the disease had only lasted nine months; this tends to show that the peculiar change is one which occurs in the early stage. In 2 other of the well-marked cases, beneath the superficial induration, there was softening of the deeper layers of the white substance. The intimate nature of the indurative change is discovered by the microscope to consist in proliferation of the elements of the connective tissue, with amyloid bodies, a congested and atheromatous state of the capillaries; in fact, the affection possesses the elementary characters of sclerosis. It was interesting to remark that in every one of these instances of changes in the anterior lobes the speech was affected; the details given by Regnard are in some cases not precise enough, however, to make it certain how far this defect was a loss of the faculty of expression or merely a muscular paralysis or ataxy.

Dr. Franz Meschede* contributes an important paper in support of the view which connects general paralysis with a definite organic lesion. After describing the well-known mental phenomena of the disease, he remarks that attacks of paralysis, with general convulsions, come on at certain epochs, which correspond with the climax of outbursts of ideal and emotional excitement or fever, in the more chronic cases, at least with the end of a period of unusual agitation. The convulsive attacks mark out the steps by which the paralytic process goes on to complete annihilation. Their actual cause is not made out. They are the coeffects of the paralytic process; and they indicate that even in the more chronic cases an active process of organic destruction is continuously going on. The essential nature of the mental exaltation is regarded by Meschede, not as a weakening of intellect, but an inordinate expansion of the self-feeling; he compares it to the pleasing mental sensations induced by wine; he regards it as a characteristic result of *turgescence of the cortical substance*, or mind-organ, and points to the ample capillary network which is supplied to the inner layer of the cortex as a facile instrument of this kind of turgescence. In general paralysis he supposes that this functional affection is accompanied by great acceleration of changes of tissue, and he thus accounts for the great expansion of the self-feeling and the emotional impulses, and also for the final disruption of mental life, regarding the whole process as one of rapid exhaustion of the vitality of certain nerve-cells of the cortex. Meschede remarks on the confusion which has prevailed among authors with regard to the seat of the pathological process. His own microscopical researches, carried on since 1857, have led him to the conviction that degeneration of the nerve-cells of the hemispheres of the cerebrum, more especially of the cortical layer, constitutes the peculiar pathologico-anatomical change in paralytic insanity. The alteration of the cells is found in different degrees, from mere parenchymatous swelling down to their reduction to molecular detritus. In acute cases the degeneration-changes are not strongly defined, but there is general turgescence and succulence of

* 'Virchow's Archiv,' 1865; 'Journ. Mental Science,' Oct. 1866.

the cortical layer, which appears darker and wetter on section than it should, and these appearances are certainly not due to post-mortem blood-gravitation or imbibition. The microscope shows, in the most intensely red portions, a highly developed capillary network, filled to excess with blood-corpuscles, with here and there points of extravasation and elongated blood-vessels. Now, between the stage of hyperæmia and parenchymatous swelling of the inner layer of the cortical substance, and that of fatty pigmentous degeneration, lies the destructive process, which, accordingly, Meschede recognises as a parenchymatous *inflammation*. He observes that we get three symptoms—hyperæmia, swelling, and increased temperature; and if we do not get pain, that is because the organ attacked is not one which perceives pain. (The absence of pain is, however, an argument against the affection being a *meningitis*.) The passive character of the final stage must not make us think that the whole process is a passive one. The degeneration and brain atrophy are a *result* of the disease, not a *cause*. The subjects of it are usually robust; there is an excess of nutrition, and an over-stimulation. The exaltation of the self-feeling cannot be the result of depression of the nutritive process.

With regard to the degenerative change, Meschede remarks that it is not uniform over the whole of the inner layer of the cerebral cortex, but prevails in certain definite localities. It is tolerably constant in the convolutions of the temporal lobes, and in the convexity along the longitudinal fissure, and in the anterior lobes; much less on the basilar surface, and least of all on the posterior lobes. Meschede thinks that the other cranial and cerebral changes are too variable and inconstant to constitute, in themselves, an essential pathological lesion. He mentions, among a great many other occasional changes, sclerosis of the white substance, but attaches no such importance to it as would seem to be warranted by the degree of frequency with which it was observed by Regnard. Of the various non-essential brain-changes which may complicate general paralysis Meschede says that they play their part, though a minor one, in the psycho-paralytic drama. If the nerve-cells of the inner cortical layer pass into a chronic condition of irritation and altered nutrition—if the organic vital motion of the same is altered and accelerated, running on to dissolution and disorganisation—if the inflammatory state which was once outside the nerve-cells has extended to them—then first do we trace distinct general paralysis. It is a mistake to suppose that nerve-cells are of so much more exalted nature than other cells that they cannot be in any state between perfect integrity and total annihilation of their function. They never cease to depend on the continuous vegetative force of the organism; they have their development, their history, their different ages—their adolescence, decrepitude, and premature old age. They depend on the integrity of the arterial blood supply. If we accept Virchow's general principle of the independence of the individual cell-life, we must assume a greater possibility of disturbance of their vital movements, a greater capacity for disease. And we must assign certainly not the lowest place to the cells of the central nervous system which presides over muscular nutrition and receives excitation on all sides. The vegetative life of the brain is most concentrated, the interchange

of matter is most active, in the inner layer of the cortical substance; and if by irritation it is fused it must undergo a morbid excitation, both the bounds of vegetative and of functional life will be broken down, and then follows destruction of mental strength. This violent action is inharmonious, turbulent, and confused, presenting the characteristics of destruction and annihilation. Both the centripetal and the centrifugal energy of the cerebrum is weakened, receptivity and recollection, and also expression of ideas and wishes. This shows that not only dynamic or functional, but also organic, disease exists. These views are confirmed by observation of the etiology of the disease. Men in the prime of life are chiefly attacked, whose activity of brain-life and brain-circulation is in excess; who take a strong flesh diet, much meat and drink; who fully taste life's troubles and joys, excitements and delights; whose brain is much irritated, somatically and physically, and whose power of resisting is weakened by hereditary taint or illness. The average age at which it occurs ($41\frac{1}{2}$ years) is that which just precedes the attainment of the fullest brain-development, a time at which there appears to be always a great nutritive excitement going on.

In some remarks with which he prefaces his translation of the above paper of Meschede, which appears in the 'Journal of Mental Science' for October, 1866, Dr. G. Fielding Blandford takes occasion to complain of the present state of the nomenclature of general paralysis, and especially to the introduction of what he considers the very objectionable term "general paresis," which is without any definite meaning whatever. He thinks that the appellation adopted by Calmeil, "*peri-encephalitis chronica diffusa*," is the most scientific which has ever been proposed, and that the paper of Meschede bears strong testimony to its correctness. Blandford thinks that the line of demarcation between ordinary insanity and general paralysis is very fine, and that the whole history and progress of the latter point rather to a difference in degree than in kind. That general paralysis is intractable—*malignant*—is the one fact we are certain of. That the parts attacked in general palsy and ordinary mania are the same, he thinks, for the following reasons:—1. General paralysis constantly exists, and is evidenced, beyond any doubt, by the mental symptoms alone. 2. The defect connected with the articulate speech seems to be in the nerve-centres which supply volitional power, for the patient, by a strong effort in which he forces all his nervous energy in the direction, can correct it. This would account for the absence of unilateral symptoms, which are often absent throughout. *Stammering* is probably an example in which the highest originating centres of nerve-force are similarly defective. 3. Moreover, the causes of general paralysis are so often the same as those which produce ordinary insanity. At first sight it might appear that the former was much more frequently produced by sensual excesses, &c., but in truth it is very frequently attributable to mental causes. Blandford believes that the inflammation theory, which led men formerly to administer mercury in this disease, was more correct than the treatment which it suggested to their minds. In order to clearly indicate what he means by "inflammation," he quotes Mr. Simon's comparison of the process of simple inflam-

mation with that of hypertrophy on the one hand and that of malignant growths on the other. Cancer has the most intimate morphological affinity with inflammation, and probably what is distinctive of the former lies less in its textural phenomena than in the hitherto unknown causes which give them their fatally *continuous progress*. Blandford would seem to regard general paralysis as an inflammation of the fatally continuous kind; while the hyperæmic and hyperactive condition of the brain in acute mania may subside, perhaps recur, subside again, and so on. General paralysis may be called the malignant disease of the grey matter of the hemispheres.

The subject of general paralysis and its pathology is also taken up by Dr. Wilks in a very important paper on nervous diseases,* which will be repeatedly referred to in these pages. After remarking that a variety of morbid processes, caused by very different influences, all tend to the final production of an atrophy essentially the same as that which occurs in the later stages of general paralysis (as, *e.g.* chronic lead and mercury poisoning, chronic alcoholism, and even simple old age), Wilks says that, although the post-mortem appearances may be closely alike, it is very possible that the early conditions of the organ may not be the same, and that the accompanying symptoms may, in these different affections, present peculiarities of their own. He illustrates this by the well-known tendency to a common final result—atrophy—in a great variety of kidney diseases. In the case of general paralysis there is reason to think the cineritious brain-substance suffers a peculiar inflammatory change. Wilks is inclined to make a broad distinction between this disease and other forms of insanity, which, he remarks, are generally dynamic and functional, dependent upon an inherent failing, and manifested by peculiarities of manner, habits, and feelings. He cross-questions the alienist physicians on the point whether they are prepared to identify general paralysis by its ensemble of symptoms, or by a certain number of them, independently of post-mortem proof of a change in the grey matter. The mental *exaltation* usually met with, though highly peculiar, is not absolutely constant. Can the state of the pupils, or the progressive paralytic symptoms, be depended on for differential diagnosis from alcoholism, for example? Scarcely so; and the points of distinctive *history*, which often would render diagnosis easy, are sometimes wanting or indecisive, especially as the latter disease often leads to the former. In studying the chronic affections of the brain, we should try to discover which symptoms are universal, and which are peculiar to particular forms of disease; these complaints can, *as a rule*, be distinguished by the circumstances attendant upon them.

Wilks describes the morbid changes of the cortical brain-matter, on the whole, in similar terms to those adopted by other observers. It is necessary to observe, however, that he seems distinctly to point to the *outer layers* of the cortical substance as chiefly affected, and he enforces this by speaking of the adhesions of the membranes, which he says are frequently met with, as corroborative evidence.

* "Observations on the Pathology of some of the Diseases of the Nervous System," 'Guy's Hosp. Reports,' 1866.

(This view is directly opposed to that of Meschede, quoted above. This observer dwells strongly on the predominance of changes in the *inner layer* of the cortex, and the observations of Baillarger and Regnard on changes in the white substance so far confirm his opinion.) And he dwells on a circumstance which scarcely seems to be generally recognised, viz. that general paralysis may be caused in a non-predisposed person by a simple injury, and on the much greater frequency with which it is developed in members of families free from tendencies to insanity than other kinds of mental disease are.

Mr. Lockhart Clarke discusses the morbid anatomy of the same disease.* He notices the importance of Robin's discovery (about 10 years since), that even in healthy brains a great number of the capillaries are found to be surrounded with sheaths, similar in all *essential* particulars to those which have been considered morbid products in general paralysis and other brain affections, a fact which Clarke fully confirms from his own observation. The changes in general paralysis are, however, striking and real. Even the naked eye will often discern streaks and lines radiating through the grey and white substances towards the surface. On vertical section of the convolutions a number of oval slits are noticed; these are the mouths of vessels surrounded by their sheaths. But the sheaths are often much less delicate than in health; they are thicker, more conspicuous, and often darker; and sometimes they appear as fusiform dilatations, especially when the vessels are contorted.

In general paralysis, also, the grains and granules of hæmatine are generally far more abundant than in health, being scattered in some places and grouped in others. In the nerve-cells of the convolutions Clarke has often discovered certain structural changes not yet described; they consist in the presence of an immense number of pigment-granules, which sometimes completely fill the cell. In other instances the cell has no sharp outline, and resembles an irregular heap of particles about to fall asunder.

From the considerable space which we have necessarily given to the above subjects, we are unable to find room for any further analyses of papers on mental diseases, but the following are noteworthy publications on this subject:

Albut, on a form of insanity connected with hydrocephalus ('Allg. Ztsch. f. Psych.,' xxii, 2, p. 10). A. Addison, mental affections in epilepsy ('Journ. Ment. Science,' April, 1866). Bastian, Charlton, specific gravity of different parts of the brain ('Journ. Ment. Science,' Jan. 1866). E. Bouchut, on sense and sensation ('Union Méd.,' 40, 44, 1865). Bacon, M., and Wilks, pathology of a case of general paralysis ('Journ. Ment. Science,' April and July, 1865). T. Belgrave, bromide of potassium, &c., in mental diseases ('Journ. Ment. Science,' Oct. 1865). Besser, relation of rheumatism to mental diseases ('Allg. Ztsch. f. Psych.,' xxii, 3, 1865). Briere de Boismont, influence of family life in the treatment of insanity ('Gaz. des Hôp.,' 101, 1865). Berthier, secretions of the skin in relation to insanity ('Presse Méd.,' xxii, 1865). Bottcher, cannabis indica in mental diseases ('Berl. Klin. Woch.,' xvi, 1866). J. M. Chalrand, coffee in the treatment of cretinism ('Union Méd.,' xxxvi, 1865). L. Danner, view of the epidemics of delirium in different historic epochs (Tours, 1865). Griesinger, etiology and pathology of mental diseases ('Arch. d. Heilk.,' 1866, p. 388). Griesinger, prognosis in mental diseases ('Journ. Mental Science,' Oct. 1865). Hlrczeghy, epidemic goitre, with reflections on cretinism (Bologna,

* 'Lancet,' Sept. 1, 1866.

1865). J. C. Howden, case of pellagra with insanity ('Journ. Ment. Science,' April, 1866). Idiocy, psychology of ('Journal Ment. Science,' April, 1865). Jousset, alienation and madness, their distinction and classification (Paris, 1865). Krafft-Ebing, mania transitoria (Erlangen, 1865). Kühn, on the epidemic of hystero-demonopathy at Morzine ('Ann. Méd. Psych.,' Juillet, 1865). Leidesdorf, on moral insanity ('Wien. Med. Wochensch.,' lxx, 1865). Lagardelle, dipsomania, &c. ('Gaz. Méd.,' v, 1865). E. Muguier, insanity consecutive to acute diseases (Paris, 1865). H. Maudsley, certain forms of insanity which are often confounded ('Lancet,' April 14, 1866). Moreau, hysterical insanity, &c. (Paris, 1865). A. Mitchell, idiocy of traumatic origin ('Ed. Med. Journ.,' April, 1866). Morel, delirium, &c., as a symptom of abdominal disease ('Arch. Gén.,' Avril, Mai, 1866). Sankey, on various forms of mental disease ('Brit. Med. Journ.,' 1865, several papers). Schmelzer, the use of narcotics in alienist practice during the last 15 years ('All. Ztsch. f. Psych.,' ii, 1865). Sheppard, treatment of insanity with the Turkish bath ('Journ. Ment. Science,' April, 1866). D. H. Tuke, artificial insanity (ibid., April, 1865). Tissot, on the influence of the imagination on the passions, on immorality, and on mental disease ('Ann. Méd. Psych.,' Mars, 1866). Dr. J. Thurnam, on the weight of the brain, and the circumstances affecting it ('Journ. Ment. Science,' April, 1866).

From the subject of general paralysis of the insane there is a very natural transition to cases of cerebral sclerosis, with predominance of motor phenomena.

Sclerosis affecting the Mental and the Motor Centres of the Nervous System.

Dr. Urstphal* reports the history of 10 cases (and the post-mortem examination of 8 of them), in which the symptoms of advanced general paralysis were added to those of tabes dorsalis. In 7 of these cases mental disorder of an exalted type occurred at an early stage; in the other 3, on the contrary, the first mental symptom was intellectual feebleness, and this developed gradually into the deepest apathy, but in all the cases imbecility was finally developed. Of the 8 post-mortem examinations each revealed the existence of grey degeneration of the posterior columns of the cord; but, oddly enough, Urstphal does not record the condition of the cortical substance of the brain in any. He seems to be of opinion that in some of these cases the disease was a true tabes dorsalis (not an original affection of the posterior columns of the cord), and secondary to the brain changes of general paralysis. Pathological anatomy has not yet afforded proof of the possibility of such an occurrence, though Joffé and Erlenmeyer have pronounced their opinion in favour of it; and it is remarkable that that most important symptom of tabes—the inability to keep the upright position with the eyes shut—is wholly wanting in general paralysis. Urstphal does not explain how it was that the mental symptoms in 7 of these cases were exactly those of common general paralysis.

Professor W. Zenker† gives a remarkable case in which extensive sclerosis both of brain and spinal cord took place. The patient was a single woman, æt. 30, whose father had been a drinker and died paralysed. One of her brothers had already had an apoplectic attack. She had been healthy up to the commencement of this illness, which was 4 years before her coming under Zenker. At that time she was seized with violent spasms of the stomach, causing faintness and loss of con-

* 'Allg. Ztsch. f. Psych.,' xxi, 361; 'Schmidt's Jahrb.,' 126, p. 117, 1865.

† 'Zeitsch. für rat. Med.,' xxiv, 2 and 3, p. 238, 1865.

sciousness for an hour and a half. A similar attack occurred 6 weeks later, and it was repeated, with varying intervals, up to her admission to the hospital, November, 1863. There had been scybalous motions throughout her illness, and for the last year some difficulty in making water. Immediately after her first attack she had begun to suffer from weakness and trembling of the hands, which gradually increased. A year later the head became similarly affected, but this only lasted 3 months; the tremor of the limbs and staggering gait prevented her attending to business. No pain or abnormal sensations, except the stomach spasms. The patient was a slight and graceful woman, with a head small in every diameter, with bad general nutrition and weak muscles. There was no marked psychical lesion, but both her intelligence and her disposition were variable, and she had causeless whims alternating with tears, and made childish hysterical complaint about little annoyances, bodily or mental. The most marked symptom was *weakness* of the limbs (the left side most) and *tremor*, which never ceased except when she was supine or asleep; directly she moved, head, arms, and legs were seized with tremor; the gait was tottering, and even when standing still she needed a support. Speech slightly stuttering, with snapping movements; no dysphagia; all the muscles were electrically irritable; sensibility (except muscular) and reflex actions unimpaired. Epigastrium somewhat prominent and sensitive. There was chronic cough, with mucous expectoration. Induced electricity was tried without success, and then strychnia was given in doses increasing from $\frac{1}{20}$ th to $\frac{1}{4}$ th of a grain daily. No toxic symptoms occurred, and there was even some improvement in the atactic condition. Two severe attacks of cardialgia occurred during the winter. In January the menses appeared for the last time; henceforth there was no improvement. On March 6, after a good night, she suddenly became apathetic and motionless. Face—especially on right side—deep red, and swelled; skin hot; profuse sweating. Respiration slow, irregular, and noisy; pulse 136; temperature 39.6 Cent. Speech quite lost; she answered questions only with unintelligible sounds and gestures; complained constantly of severe pain in back of head. Mental life little altered; sight and hearing unaffected. *Right half of body quite palsied*; right pupil wide and fixed; left normal, only feebly active. Right side of face more flabby than the other; right corner of mouth hanging. Mouth and point of nose drawn slightly to left; tongue could not be protruded; tongue-point and uvula deviating a little to left. Swallowing, even of liquids, very difficult. Voluntary power of right limbs gone, of left limbs intact; ptosis of *left* eye. Sensibility and reflex acts good on the paralysed side. Urine and fæces involuntarily passed; anorexia and thirst; epigastrium very tender; belly drawn in and tense; no albumen in urine; much cough, with sparse mucous expectoration. No special abnormal sounds in chest; spine very tender between second and fourth cervical vertebræ. This condition lasted till evening; the patient then for some time recovered speech, passed urine voluntarily, and moved the extremities well; but next morning she was again apathetic, and the paralysis was even more developed, the whole right side and the left leg being palsied; of the left upper extremity only the

hand could be opened and shut. The left pupil was dilated and fixed; the sensibility of the paralysed parts was now quite gone, except in the trunk; reflex activity weakened. In the evening (7.30) the temperature was 40° Cent., and the paralysis had diminished; speech returned, though weak and unintelligible; tongue readily protruded; swallowing easier; both hands could be opened and shut. At 11 p.m. the whole left arm could be moved, but sensibility and reflex action in the affected parts were quite lost. Patient chiefly complained of pain at back of head and epigastrium; then nausea and burning thirst, and towards morning a greenish watery fluid was vomited. Next morning there was decided improvement, and the temperature had fallen to 37° Cent.; but in the evening there was a relapse, and these alternations went on day by day. In April œdema of the feet came on, and extended upwards, and there was sloughing of the sacrum. The apathy became more and more pronounced; the mind was clear, but no attention was paid except to bodily needs. Death on May 12. At the autopsy the skull was observed to be small in every direction; the os frontis was strikingly narrow. Much œdema of arachnoid; basis cranii normal; calvarium thin; slight "pachymeningitis" of the dura mater and of the convexity of the brain. On various sections of the brain being made there were found, in the tough and firm white substance, spots of sclerosed tissue of various sizes; there were several in each hemisphere, but they were especially numerous in the fornix, the tenia, the peduncles. The cerebellum was normal, but in the pons (under side) there were numerous sclerosed spots, also in the crura cerebelli *ad pontem* and *ad med. oblongatam*, and in the lining of the fourth ventricle. The spinal cord felt tough to the finger; its consistence approached that of coagulated albumen; this was most strongly marked in the cervical region, while at the cauda equina the condition was normal. Transverse section at the cervical region showed the posterior cornua dirty grey in colour, and seeming enlarged, from the similar affection of neighbouring parts. The medullary matter of the lateral columns appeared abnormally small. These peculiarities steadily diminished downwards. In the lumbar region nothing abnormal could be detected by the naked eye. Microscopic examination of the sclerosed spots of the brain showed many nuclei scattered among fibres of connective tissue; no trace of brain-elements or nerve-fibres; corpora amylacea in great numbers, partly isolated and partly imbedded in the sclerosed tissue. After preparation with chromic acid a connective tissue was seen, which consisted of fine fibres. These fibres appeared partly reticulated, and contained in their meshes many oval, somewhat flattened, or egg-shaped and indented nuclei. Around the nuclei the cell-projections and cell-membrane could not be certainly distinguished. Acetic acid made the fibres quite disappear. The capillary vessels had many nuclei in their walls, which were also for the most part dotted with fat. The non-sclerosed brain-tissues were not notably changed, yet in the neighbourhood of the sclerosed spots grey cells were found, dotted with fat. Sections from the cervical region of the cord showed essentially the same changes as those observed in the brain; there were even more bundles of connective tissue. The lateral columns contained normal nerve-fibres.

The etiology of this and similar cases with which it may be compared is obscure. Most of them belong to the period of childhood and adolescence. Among adults there are fewer and fewer examples of the disease; the oldest recorded subject of it was 60. It most frequently runs a course of from two to five years; on the other hand, it has been known to terminate in a few months, or to last as long as ten years. There are always symptoms of disordered intellect—either declared idiocy and chronic mania, or a greater or less degree of imbecility; and the intelligence tends to decrease *pari passu* with the progress of the malady. In the above case (the intellectual state being relatively high for such a case) motiveless caprice seemed to be the expression of the psychological lesion. The first signs of altered nervous activity concern chiefly the motor sphere, viz. slight twitchings of the face, weakness and tremblings, altered sound of voice, &c. The motor lesions usually extend upwards from the lower extremities, and, at the same time as they assume intensity, affect at once the upper extremities, the sphincters, the muscles of respiration and swallowing, and finally the muscles of the trunk and face. Only in rare cases does the paralysis begin unilaterally (then almost always in one *leg*); still more rarely does it remain limited to one side. Convulsions and cramps, especially observed in children, are by no means constant; if they occur, it is usually towards the close of the disease. Sensibility does not seem affected in the same way as motility. Also the affections of it which sometimes accompany the disease (as giddiness, severe headache, neuralgia) are not found in all cases; often they occur at the outset, but disappear before the end. Almost never, except in cases of paraplegia, is sensibility altogether destroyed. Only, the muscular sensibility seems very early to be specially impaired. As to the higher senses, deafness, amblyopia, and even amaurosis, have been observed, but rarely. Hemiplegia and paraplegia are frequent in the course of the disease, but they are usually slight in grade or commence only a little before death. The *febrile period* in the above case is unique in the history of brain and cord sclerosis; no such circumstance has been ever recorded. The prognosis is absolutely bad. The white substance alone is usually affected, to the exclusion of the brain-cortex.

Progressive Locomotor Ataxy.

Mr. Lockhart Clarke* makes important contributions to the history and pathology of this disease. In regard to diagnosis, he remarks that in its advanced stages, when two or three of the ordinary symptoms are accompanied by unsteadiness of gait, it is easy enough, in general, to determine the nature of the disease; but at an earlier period, before the loss of muscular co-ordination has made its appearance or become sufficiently marked, and when only one or two, perhaps, of the other symptoms are present, it is exceedingly difficult, or almost impossible. He suggests some means by which the true value may be affixed to certain early symptoms, which belong not only to ataxy, but to quite different diseases. *Strabismus, e. g.*—if heralding ataxy—is generally accom-

* 'St. George's Hosp. Rep.,' 1866; 'Lancet,' June 10, 1865.

panied by *amblyopia*; and if it be single, the amblyopia will be on the corresponding side. The premonitory *pains* in ataxy are remarkable, not only for their sudden appearance and disappearance, and their tendency to shift rapidly, but also for a singular proneness to fix on one particular spot for many hours together. As regards the unsteadiness of gait, which is the principal feature in developed cases of ataxy, Clarke points out that the test proposed by Trousseau for distinguishing it from that which is present in cerebellar disease does not always hold good. This test consists in placing the patient, with his eyes shut, in a standing posture, with his feet close together. If he be atactic, it is said, he will fall; if the subject only of cerebellar disease, he will maintain his balance. Clarke relates the history of a man, æt. 42, who had, among other symptoms, an unsteadiness of gait much resembling ataxy, and who, on the application of Trousseau's test, fell to the ground. Nevertheless it was certain, from various other marked symptoms (vertigo, mental affection, facial palsy, defective articulation) which were present, that the disease was really intra-cranial. But there are cases in which ordinary paralysis is complicated with locomotor ataxy; and Clarke gives an instance in which, along with difficulty in walking, there were amblyopia, diplopia, atrophy of the third and sixth cerebral nerves, numbness of the fingers, inability to hold anything in the fingers without constantly looking at it, and, finally, characteristic changes in the posterior columns, all of which were indicative of ataxy; while there were also a number of cerebral symptoms, and, after death, there were found clots in the brain and softening of the cord which belong to ordinary paralysis. The diagnosis in these compound cases would be difficult; but Clarke suggests that in atactic muscles which become palsied, and then begin to recover themselves, the predominance of the ataxy will be inverse to that of the paralysis; and this may assist diagnosis. Among the symptoms which may especially aid in the distinction of some obscure early cases of cerebral or cerebellar disease from ataxy he enumerates attacks of vomiting, temporary hemiplegia, and the retention of sexual power. If these be present *collectively*, and the patient be young, the possibility of the existence of brain disease is very strong. [It is worthy of remark that Trousseau and some other writers differ very much with Clarke about the sexual function in ataxy. They state that it is often even greatly *above* the normal power in the early stages of that disease.] *Pain in the head*, especially of a severe and persistent character, is in favour of the diagnosis of cerebral disease. *Impairment of sight*, when a symptom of ataxy, rarely improves; it usually goes on from amblyopia to complete and permanent amaurosis. A disease which, under some circumstances, may be readily confounded with ataxy is general paralysis. Of course, in most cases of the latter the very peculiar mental affection present is at once sufficient to identify it. But there are a few cases in which this condition is quite absent; and if in such there be also strabismus, amblyopia, amaurosis, acute pains in the limbs, more or less incontinence of urine, with a jerking or spasmodic gait, the diagnosis from ataxy may be excessively difficult. Muscular atrophy (Cruveilhier's disease), in its early stages, is occasionally very hard to distinguish from ataxy. When wasting of the muscles affects

the lower extremities, although at first not perceptible to the senses, it may produce unsteadiness of gait; and if associated with numbness and shifting pains, as is sometimes the case, the resemblance is extremely close. Again, ataxy and muscular atrophy may *coexist*, and in such cases the atactic symptoms will easily be overlooked. Syphilis may very easily cause symptoms greatly resembling ataxy; thus, there may be palsy of any of the cranial nerves, and consequent strabismus, diplopia, amblyopia, or ptosis, and it is needless to say that it can produce pains in the extremities; but, besides this, syphilitic deposits in the vertebral canal may cause pains, formications, and even unsteadiness of gait. Hence the importance of careful inquiries into *history* in every quasi-atactic case.

In regard to pathological anatomy, the following is a brief summary from the paper in the 'St. Geo. Hosp. Reports,' but a much more lengthened account is derivable from Clarke's report appended to a case of Dr. J. H. Jackson's ('Lancet,' June 10, 1865).

"In true locomotor ataxy the spinal cord is invariably altered in structure. Its membranes, however, are sometimes apparently unaffected, or affected only in a slight degree; but generally they are much congested, and I have seen them thickened posteriorly by exudations, and adherent, not only to each other, but to the posterior surface of the cord. The posterior columns, including the posterior nerve-roots, are the parts of the cord which are chiefly altered in structure. This alteration is peculiar, and consists of atrophy and degeneration of the nerve-fibres, to a greater or less extent, with hypertrophy of the connective tissue, which give to the columns a greyish and more transparent aspect, and in this tissue are imbedded a multitude of corpora amy-lacea. Many of the blood-vessels that traverse the columns are loaded or surrounded to a variable depth by oil-globules of different sizes. For the production of ataxy it seems to be necessary that the changes extend along a certain length—from one to two inches—of the cord. The posterior nerve-roots, both within and without the cord, are frequently affected by the same kind of degeneration, which sometimes extends to the surface even of the lateral columns, and occasionally along the edges of the anterior. Not infrequently the extremities of the posterior cornua, and even deeper parts of the grey substance, are more or less damaged by areas of disintegration. The morbid process appears to travel from centre to periphery—that is, from the spinal cord to the posterior roots. In the cerebral nerves, on the contrary, the morbid change seems to travel in the opposite direction—that is, from the periphery towards the centres. From the optic nerves it has been found to extend as far as the corpora geniculata, but seldom as far as the corpora quadrigemina. With the exception of the 5th, 7th, and 8th pair, all the cerebral nerves have occasionally been found more or less altered in structure."

MM. Charcot and Bouchard* relate the post-mortem examination of a woman who died of hydrothorax, after suffering for 11 years from darting pains in the lower limbs, which were the only symptoms of

* 'Gaz. Méd.,' 9, 1866.

commencing tabes dorsalis. The pia mater and arachnoid were sprinkled over with old meningitic deposits. The posterior columns showed nothing to the naked eye beyond a certain greyish semi-transparency. But the microscope revealed increase of the connective tissue and numerous corpora amylacea, although the nerve-fibres were sound. These appearances were much the most clearly developed at the lumbar enlargement, and from this downwards to the cauda equina, but careful examination showed them to exist more or less throughout the whole length of the posterior columns of the cord.

Dr. Nothnagel* relates one of the most typical cases of locomotor ataxy which have been put on record. The patient was a man, æt. 39, and the onset of the malady was undoubtedly induced by exposure to severe cold when he was in a condition of great fatigue. The first symptoms were periodically recurring neuralgic pains, and these, with occasional feelings of fatigue, were for some time the chief ailments. Difficult urination and constipation of the bowels were next added. The characteristic ataxy of locomotion commenced later, and in a striking way; the patient would walk perfectly well for long distances during the day, but by night was obliged to feel his way with his hands, and dared not go over a bridge in the dark. As yet, however, there were no *subjective* symptoms of diminished sensation. The insecurity of gait gradually increased, yet the patient continued to be able to walk long distances. Besides the neuralgic pains, which were in very various parts of the body, there was a high degree of anæsthesia, with diminution of the perception of pressure and the sensibility to electricity, especially in the lower extremities. The 5th cranial nerve was affected in a peculiar manner; the parts supplied by the ophthalmic division were hyperæsthetic, and the branches from the second and third division showed their participation by the existence of a numb feeling in the teeth and by various abnormal sensations of taste. There was marked diminution of auditory perception, with abnormal sensations almost amounting to hallucinations of hearing. Death occurred 24 hours after a sudden access of fever, with mental excitement, about 4 years after the first symptoms. Post-mortem examination showed "grey degeneration" very accurately limited to the posterior columns of the spinal cord, vanishing gradually at the calamus scriptorius in the medulla oblongata. The place of entrance of the posterior roots of the spinal nerves was the place of greatest development of the degenerative change, and the lumbar portion of the cord was much more affected than the dorsal and cervical. The microscopic appearances of the degenerated matter corresponded closely to those which have been described in the papers of Zenker† and others on sclerosis. It is unfortunate that in the present case no microscopic inspection is reported of the nuclei of the trigeminus and of the auditory nerve.

Progressive Muscular Atrophy (Cruveilhier's Disease).

On this subject a great deal which is interesting has been recorded.

* 'Berlin. Klin. Wochensch.,' xvii, 1865.

† Vide *suprà*.

Dr. Radcliffe* gives us the history of a case of this disease *successfully treated*. The patient was a girl, æt. 19; the weakness and wasting had been going on for 5 years. The muscles of the ball of the left hand were partly, and the interossei and lumbricales almost entirely, atrophied; the latter could not be roused to action by the magneto-electric current. There was no numbness in the parts, but they were bluer and colder and the pulse was smaller than that of the healthy limb. The patient was otherwise quite healthy, and had never injured herself in any way.

The treatment ordered was as follows:—Faradisation, kneading of the parts, and suitable localised movements, daily. Half a drachm of syrup of iodide of iron, three times a day; full diet and porter. About 7 weeks afterwards, and after 26 Faradisations, the patient was reported almost well; the hand (which had previously been of the “bird’s claw” form) had very nearly recovered its full form and functions. Five weeks later the cure was quite perfect.

Mr. Lockhart Clarke gives the particulars of the microscopical examination which he made of the nervous centres of a patient whose very interesting case (one of general muscular atrophy) is related by Dr. Thudichum.† The preparation for microscopical examination was by the same process which Clarke has already fully described. The patient, a gentleman, æt. 54, was attacked with paralytic symptoms, first of the lower extremities, then of the trunk muscles, then of the arms, and finally he died from gradually increasing paralysis of the respiratory muscles. In each region the paralysis was followed by acute wasting of the muscles. Clarke found, in the *conus medullaris*, nearly all the grey substance and part of the posterior columns replaced by a morbid and cylindrical mass. Through the lower portion and middle of the lumbar enlargement only part of the posterior columns were replaced by the morbid cylinder, the rest being unnaturally soft. A large portion of the posterior roots was also involved on the softening, as was also the posterior part of the lateral column in the right side. The cells of anterior grey substance and of posterior vesicular columns were more or less atrophied, and wholly or partially filled with pigment-granules. In the upper part of the lumbar enlargement there was a variable degree of softening of all the white columns, but particularly of the posterior on the right side, with softening and injury of the posterior commissure, from which they were separated. The posterior vesicular column on the right side contained similar patches of granular degeneration; that on the left entirely disappearing in some sections. The form and symmetry of the grey substance were strangely altered in some sections. The anterior cornua were somewhat abnormal in size, and their cells more or less loaded with pigment-granules. In the brachial enlargement there were several dilated degenerated vessels on each side of the canal, surrounded by transparent patches of grey degeneration, which involved the posterior commissure and, in some places, the inferior. Posterior columns more or less softened, especially their deeper portions, which rested on the

* ‘Lancet,’ January 14, 1865.

† ‘Beale’s Archives,’ iv, No. 13.

posterior commissure. Cells of anterior cornua somewhat atrophied and loaded with pigment-granules. Similar appearances were found in those regions of the spinal cord which correspond to the other paralysed and atrophied muscles. Clarke observes with regard to the atrophy of muscles that he entertains no doubt that it depends upon atrophy of the ganglia of their nerves. The transparent grey degeneration (sclerosis) of all these regions of the cord which supplied these nerves, and the great amount of corpora amylacea and pigment-granules in the nerve-cells, confirm this idea, both in this case and in others which Lockhart Clarke has examined. In one of these latter it is interesting to note that the symptoms commenced soon after a *sunstroke*, and Thudichum's patient was taken ill soon after a violent fall and blow on the back of the head. Clarke thinks that shock to the brain may have been the cause of the mischief in both cases, and suggests that careful inquiry should always be made for a possible cause of this kind.

Finally, it is very interesting to note that sensation was reported to be *everywhere perfect* throughout Thudichum's case, notwithstanding that in the middle of the lumbar enlargement the superficial halves of the posterior columns were softened to pulp, and that here a large proportion of the posterior roots were quite lost. These facts support the conclusion that the posterior columns cannot be the only channels for sensitive impressions, an opinion at which Clarke arrived in 1853, two years before Brown-Séguard's announcement of it.

Cerebral Softening.

Upon this subject three noteworthy treatises have been produced in France by MM. Prevost and Cotard, Dr. Adrien Proust, and Dr. Laborde.

MM. Prevost and Cotard* have studied afresh, both from a clinical and experimental point of view, the pathology of the disease. Their experiments consisted of ingenious modifications of the proceedings adopted by various German observers, and by Vulpian and Charcot in France, for producing artificial embolism. They injected into the arterial circulation of dogs water holding in suspension inert bodies calculated to be arrested in the smaller arteries. Previous experiments had proved that such injections, passed into the carotid, in the direction of the brain, produced remarkable effects. But former experimenters had employed inert substances of such small size that their diffusion was very wide and general, and extended into the finest vessels of the brain. The spores of lycopodium answer to this description. Now, when such bodies are injected in considerable numbers into the carotid, the result is an abrupt and severe interference with the cerebral functions, and rapid death preceded by coma and convulsions. Prevost and Cotard bethought them of injecting larger bodies, which would be arrested before reaching the smaller arterial ramifications, and, accordingly, they employed *tobacco seeds*. In their first series of experiments

* 'Études physiologiques et pathologiques sur le Ramollissement Cérébral,' par J. L. Prevost et J. Cotard, Internes des Hôpitaux, Paris, Ad. Delahaye, 1866.

the injection was passed into the carotid towards the brain. In another series they injected into one carotid towards the heart, so that the seeds might be carried to the brain by the other carotid and by the vertebrals; in the majority of these latter experiments the embolism did not take effect in the brain, but in the arterial system of one or more of the other viscera. On another occasion they injected into an axillary artery, and on another into a crural artery. The results obtained by these experimental proceedings, and the remarks made on them by the authors, are of such a high interest and importance that no mere analysis can supersede the necessity of studying their work. It will be better to state here the general results, as given in the *résumé* with which the authors conclude. After remarking that their investigations were not intended to explore the pathology of *all* forms of ramollissement, and that they had designedly omitted any examination of inflammatory softening, they say—"Experiments on animals have enabled us to produce, by means of artificial embolisms, softenings of the brain identical with those which are seen in man, and to follow the process in its different stages. We have thus been able to study the hyperæmia of the commencement, the necrobiotic degeneration which succeeds, and finally the production of connective tissue and the formation of the *plaques jaunes* which belong to the third stage of ramollissement. . . . Following the advice of M. Vulpian, who had already produced in a dog well-defined softening of the cerebellum, we were able to make experiments which, as they did not suddenly kill the animal, allowed us to follow the morbid process in its whole development, and to compare with it the embolisms which in many of our experiments were simultaneously produced in the viscera. We have established—that a manifest congestion is always produced in the parts to which the obliterated artery is distributed, and we have shown that, in the present state of science, it is difficult to explain the cause of this hyperæmia. Whatever may be its mechanical cause, this fact suffices to prove that the hyperæmia of red softening, from which people have argued to the *inflammatory* nature of this affection, must be considered to be of quite a different nature. We were able to seize the very commencement of the process of molecular death, and to show that from the 3rd day there exist well-marked granular bodies, and a great many fat-granules not as yet agglomerated, and which enclose the capillary vessels like a sheath. Even the walls of the capillaries sometimes presented a consecutive granular fatty degeneration, and in 1 case dissecting aneurisms. Finally, in a dog which survived the operation for 5 weeks we observed the necrobiotic process terminate in the formation of a *plaque jaune* (process of cicatrization) on the surface of the convolutions. The analysis of our observations (clinical studies at the Salpêtrière, where ramollissement is extremely common, in the services of MM. Charcot and Vulpian) has enabled us to identify cerebral softening consisting in an analogous morbid process to that which we had studied in dogs. This molecular death of cerebral tissue has seemed almost constantly explicable by embarrassments of circulation, of which the starting-point was variable according to the case, and we have established the fact of a certain relation between the different species of these embarrassments

of blood supply and the character of the softening; the starting-point of these disturbances of circulation often consisted in obliteration of an artery by thrombosis or embolia; sometimes in mere atheromatous degeneration of the arteries; sometimes, perhaps, in a more or less wide-spread *capillary* embolism. In only 2 cases did we fail to detect any cause of difficulty of circulation; but an embolism may have escaped our notice, as the search for such an affection is very tedious. None of our observations have permitted us to make sure that the softening was due to atheroma of capillaries, and we have seen that this degeneration might be *secondary*; we can say nothing precise as to this matter. To the necrobiotic process, which is the essence of ramollissement, must be added certain irritative phenomena. We have seen, in some case, inflammation produced around the obstructions which we have caused in dogs; we have attempted to compare with these phenomena the new membranous matter on the dura mater at the site of old softenings. In the section on symptoms we have insisted on the signs of cerebral ischæmia; we have attributed to this cause the giddiness and the apoplectiform attacks followed by rapid death without lesion of the centres, which the majority of authors have attributed to cerebral congestion. We have tried to establish a relation between the greater or less intensity of the attack and the greater or less generalisation of the cerebral ischæmia; finally, we have showed that thrombosis may, like embolia, give rise to a sudden catastrophe. As to paralysis, contraction of muscles, and other symptoms of softening, we have little to add to the descriptions of authors. The analysis of our observations has shown that paralysis is usually sudden in occurrence, and rarely follows a slow course, so that it is impossible to found on it a diagnostic sign of any value. Finally, the examination of rectal temperature in some of our observations, and in the statements which M. Charcot has communicated to us, enable us to say that the heat of the body is not raised in softening of the brain, as in inflammations; so that if inflammation plays any part it is only a very secondary one, and the essential process is quite of a different kind. It would be interesting to make the same thermometric researches in inflammatory cases."

Dr, Adrien Proust* reviews the whole subject, in order, in the first place, to determine the limits of the class of cases to which the term *ramollissement* may be properly applied. He traces, with great fulness, the gradual shifting of medical opinions by which the inflammatory, exudative, and hæmorrhagic varieties of softening have come to be recognised more and more as forming only a portion, and that not the largest, of the total number of cases of ramollissement. Proust considers that the word ramollissement ought to be employed in the definite sense of *molecular death of the nervous tissue*. In this sense it is a disease which has its own symptomatology and its special pathological change; and the many different pathological states which have been connected with it in medical phraseology ought to be treated only in a secondary manner. The molecular tissue—death, however, which is

* 'Des différentes formes de Ramollissement du Cerveau,' Thèse de Concours, par Adrien Proust, Docteur en Médecine, &c. &c., Paris, P. Asselin, 1866, 8vo, pp. 132.

the essence of the disease, may supervene in different circumstances. It may be the result of a vascular obstruction (thrombosis or embolia); these cases are the best understood. There are certain other organic causes to which it may be attributed, which are obscure at present. Proust, in fact, makes two chief pathological varieties:—"(*A*) Softening may occur as a consequence of an embarrassed circulation; (*B*) or it may result from an inflammatory process." But he considers the latter class of cases to be small in number, and altogether out of proportion to the instances of ramollissement from difficulties of circulation. The latter he discusses under the three divisions of embolism, obliteration of veins, and changes in the structure of the capillaries. The essence of softening, he remarks, is the alteration in the consistence of the nerve-tubes in the brain; for although the cellular elements of brain-tissue undoubtedly suffer alterations, these do not affect the *consistence* of the brain-matter and the other elements (connective tissue, nuclei, capillary vessels) are not softened. In order that a nerve-tube may preserve its physiological activity and anatomical integrity, it must (1) remain in communication with its nerve-cell, and (2) capillary vessels in its neighbourhood must remain pervious. In the nervous centres the alterations produced by a defect of either of these two conditions seems to be very much the same. The process, which is one of substitution of fat for nervous element, is a kind of molecular death (necrobiose). It is not true, however, that the loss of the action of trophic nerve-cells usually causes a *marked softening*, or anything, indeed, which would be worthy of that name; and, in fact, notwithstanding the identity in principle of the process which is set up in the two cases, Proust considers that the characteristic molecular death in ramollissement is due to interference with the nutritive current of blood. The arterial changes which produce softening are of two orders—obliterations and constrictions. Obliterations may be divided into emboli and thromboses. Constrictions are due to arterial atheroma. Phlebitis and thromboses of the sinuses, by the obstacle which they put in the way of the blood, also intervene as causes of ramollissement. With regard to the effect of capillary obstruction, he notices the very remarkable fact (noted in the treatises of Prevost and Cotard above referred to, and also by Cohn, Vulpian, Rokitansky, and Moreau) that the immediate effect of this event is to produce a *hyperæmic congestion* of the part whose blood supply is interfered with. Proust thinks a complete explanation of this at present impossible; but the fact is striking, and it has an interesting confirmation in the circumstance that the foci of red softening and of capillary apoplexy are habitually in relation with a thrombosis or an embolism. Occasionally a patch of ramollissement is pale from the first; but these cases are rare, and not improbably depend on the obliteration of a *large* arterial trunk, such as the carotid. It is noteworthy that the hyperæmia is always most pronounced towards the external surface of the brain. Whether this depends on flux of blood in the collateral arteries, or upon the great natural vascularity of the grey matter, cannot at present be determined. In the case where a number of small bodies are carried into and obstruct the smaller vessels, it may happen that a suddenly

fatal attack is produced; in such cases the tissues are not congested, but anæmic. But where the capillary embolism is more local, and causes a circumscribed softening, the same lesions are observed as a result from arterial obliteration—rose-coloured injection, with capillary apoplexy in places.

If the obstruction to circulation be *venous*, there is hyperæmia, true hæmorrhages, serous exhalation—in short, all the ordinary effects of venous stagnation.

If the obstacle be an arterial narrowing from atheroma, the current of blood which reaches the cerebral capillaries is diminished—sometimes even arrested by the great constriction of the vessel. Yet here, too, the same rose-red injection, dotted with capillary apoplexy, is produced as in obstruction by embolism. Proust further believes that even the ramollissements which are produced by atheromatous disease of the capillaries are similarly distinguished by hyperæmia.

Proust describes ramollissement with red coloration as consisting of various degrees of capillary apoplexy, there being sometimes a great number of such apoplectic points in a spot of softening. A distinct red colour is more frequently seen in the grey substance, owing to its superior vascularity. The yellow patches which are frequently seen on the surface of the convolutions are traces of red softening. Proust does not believe that there is any essential difference between the nature of red and of white softening, so called. He regards hyperæmia as a natural consequence of *any sufficient obstacle* to circulation. And the fact that it does not occur in white softening he ascribes either to the circumstance that collateral circulation cannot be set up, or else to the cachectic condition which distinguishes most of the patients who suffer from the latter form.

When softening is caused by venous obstruction it is generally superficial, and is often accompanied by subarachnoid hæmorrhage, spread as a layer over the hemisphere. It is not uncommon to observe lesions symmetrically placed in the *two* hemispheres when there is obliteration of the superior longitudinal sinus. More rarely these ramollissements are central; they are then due either to thrombosis of the cerebral veins, or the sinuses, or to phlebitis from one cause or another.

Proust does not believe that granular matter, the contents of cysts or of abscesses in the heart which have spontaneously ruptured, can produce an embolism of the capillaries. He speaks of one class of capillary embolisms, the existence of which is undoubted, and in which the obstructing matter exercises a morbid influence over and above its mechanical effect, *e. g.* the embolisms which are formed from the matter of a gangrenous lung. Such an embolism produces local gangrene. Weber, however, rejects the idea that there is any more than a mechanical effect in these cases.

Proust discusses the real nature of the “exudation-corpuscles” of Gluge, which are scattered among fat-granules and other products of the softening process. Rejecting the idea of Robin, that these bodies are white corpuscles undergoing a granular fatty degeneration, he adopts the opinion that they are nothing, in fact, but accidental groupings of fatty granules, precisely similar to those loosely scattered

around. In describing the state of the capillary vessels he carefully distinguishes between *true atheroma*, which is a *pre-existing* condition of one form of softening, and a fatty change which is the *product* of the softening process. In the first case the fatty matter is deposited in the substance of the capillary walls; in the other it is aggregated in granules on the external aspect of the vessels, or may even, in certain extreme cases, displace the capillary membrane; it is clearly derived from the molecular destruction of the nervous matter, and is not due to any previous vascular change; its microscopic appearance is very characteristic. The next change, in cases of ramollissement, which do not at once tend to a fatal issue, is one which resembles cicatrisation; it is, in fact, a proliferation of connective tissue. Yellow patches on the brain-surface contract adhesions with the pia mater; patches of softening in the central parts are partly filled up with cellular septa; healthy tissue around softened spots becomes more or less indurated. Then the colouring matter of blood which has exuded from the capillaries converts itself into the crystalline forms known as hæmatoidine. But this kind of reparative process may not occur so soon. In the forms described by various authors under the name of "chronic ramollissement," frequently large portions of brain-substance may be converted into a perfectly diffuent pulp, in which, under the microscope, the nerve-tubes are seen to be more broken up than they are in the earlier stages. But if the cicatrising process is to take place, there will be traces of new cellular tissue and embryo-plastic nuclei, indicating the approach of this repair of tissue. The effects of cicatrisation are—(a) Upon the *surface* of the brain, the production of the *plaques jaunes* of M. Durand-Fardel; (b) in the deeper parts, the conversion of softenings into irregular cavities lined with whitish or greyish cellular tissue, with numerous bands of such tissue crossing it at different places, and with a contained fluid, generally of a white colour, with suspended bodies like dust. Sometimes the walls have a yellow tint, like that of the "plaques." There is the closest relationship between central cavities and *plaques jaunes*.

Proust thinks there is no doubt that, although ramollissement, in its essential nature, differs markedly from a chronic encephalitis, yet, nevertheless, a secondary inflammation is occasionally set up around a softened patch of brain; and he compares this occurrence to the inflammation and suppuration which are frequently produced round a visceral infarctus, and which have been especially illustrated by the experiments of Virchow and others in artificial embolism. He also thinks it may possibly occur in the softened matter itself, but he thinks that as yet we have no valid evidence of this.

With regard to the *seat* of ramollissement, he observes that, as between the two hemispheres, general opinion gives a greater liability to *embolic* softening of the *left* hemisphere, though he has doubt as to this himself. He cites the opinions of Durand-Fardel and others as to the greater frequency of superficial than of central softening. The *centrum ovale*, he thinks, is very often affected continuously in superficial softening. Of the ganglia, the corpus striatum is more frequently affected than the optic thalamus. Where a brain presents several dis-

tinct patches of softening the cause has generally been an atheromatous state of the vessels.

Of inflammatory softening (which Proust would prefer to call *encephalomalacie inflammatoire*) he mentions an acute and a chronic variety. The acute form is rarely spontaneous, nearly always traumatic. It is usually superficial, and its colour varies from rose-grey to deepest red. The tissue adheres to the pia mater, and is soft, diffuent, and beneath the microscope shows vessels dilated, but not atheromatous; a more or less abundant soft, amorphous, finely granular matter containing numerous *myélocytes*; and sometimes with embryo-plastic nuclei, or even white corpuscles with their normal character. The nervous elements do not seem to have undergone a fatty granular change.

Proust considers that the affections of the cortex which occur in general paralysis and brain sclerosis are the two forms of chronic brain disease which (in some stages, at least) really have a title to be called inflammatory. He describes the anatomical changes of general paralysis in nearly the terms of Baillarger. As to sclerosis, he dwells upon this only with a view to show that the change which it produces is quite different from that of softening. He then discusses the other alterations which are habitually met with in cases of ramollissement. Of these he reckons among those (1) which may play a pathogenic part—(A) affections of the head and the pulmonary veins, (B) of the aorta and the vessels of the neck, (C) of the arteries of the base of the brain and the veins of the dura mater. (2) Among the concomitant but not pathogenic affections which are due to a common cause with the cerebral softening are capillary phlebitis, hæmorrhagic or fibrinous infarctus, multiple fibrinous deposits, capillary embolisms, the pathology of which could not be understood previously to our knowledge of the phenomena of embolism. (3) Of the changes consecutive to softening of the brain, he enumerates atrophy of the fibres, superficial softening of the hemispheres, as observed by Laborde (*vide inf.*); atrophy of the cerebral peduncle, flattening of the pons, and greyish-yellow atrophy of the anterior pyramid of the affected side (observed by Cruveilhier); atrophy of the cerebellum on the opposite side (observed by Charcot and Turner); secondary degeneration of the cord (described by L. Türck in 1851); secondary degeneration of the cerebellum and cord (observed by Charcot) of the opposite side, the spinal softening being limited to the posterior and external part of the lateral column (in a few cases there is also softening of the interior of the anterior column *on the same side as the brain lesion*); and proliferation processes extending through the whole length of the cord (observed by Bouchard and Charcot) in a case attended with irritation and permanent contraction of the limbs.

Finally, as to etiology, Proust remarks that of all predisposing momenta none are so powerful as rheumatism, since to this category belong an immense number of cases in which embolia occurs. Puerperal rheumatism is a frequent cause. Tubercle, cancer, and syphilis, are less directly predisposing. Advanced age, from its influence on the blood-vessels, is very highly predisposing.

The next place must be given to the work of Dr. J. V. Laborde.* The definite result of his researches into the "pathogeny" of cerebral softening is thus expressed:—The disease known under the partial denomination of "*spontaneous cerebral softening*" consists of a complex morbid process which appears to have its source (its immediate anatomical cause) in an organic alteration of the capillary vessels; an alteration which, in its turn, is immediately dependent on the influence of advancing age and the decay of the organism. The morbid process is itself composed of a series of phenomena, the chief of which are:—1. *In the organs of circulation*, at the outset—simple changes of form in the vessels, caused by distensions or partial dilatations of their walls; *necklace-like* (moniliform) condition; commencement of blood-stasis. Further, and progressively, dissociation of the anatomical elements of the walls of the vessels; partial rupture of the walls; partial and scanty effusion, by exhalation or extravasation, of the elements of the blood into the midst of the nervous tissues. Successive and *regressive* transformation of these (blood) elements, as seen in the varying colours of the organic tissue which is the seat of the morbid process. The above-described phenomena take their rise from a more intimate change in the capillary vessels, viz. a more or less dense deposit on the internal tunic of amorphous molecular matters and transparent oil-globules; atheromatous, and sometimes chalky, degeneration; partial and more or less complete obstruction of the calibre of the vessels by accumulation of these new-formed elements. 2. *In the nervous tissue properly so called*, in the early period—simple modifications of the physical appearance and form; shrinking, flattening, more or less appreciable deformity of the nerve-tubes and cells of the grey-substance; then, under the influence of an encroaching morbid process, disintegration and breaking up of these same anatomical elements, which undergo regressive and atrophic changes, even to complete annihilation. These changes are expressed by the minute separation of the constituent parts of the anatomical element itself, viz. separation between the cell, its nucleus, and its radiating prolongations; between the tube and the contents of its axis cylinder; finally, these scattered fragments of the injured nervous elements are impregnated with abundant fat-globules and molecular granules, and are tinted with the different shades of colour through which the colouring matter of the effused blood passes. The essence of the ultimate changes, on the one side and on the other, and as the result of the chronic process, is this—more or less complete destruction of the vascular and nervous elements of the normal tissue; total disorganization; change in the shape, external aspect, and consistence of the affected parts; softening; appearance, in the diseased spot, of new elements, pigment-granules, fat-globules, granular cells; consecutive manifestations of irritative symptoms.

The task of deducing from these facts the *species* of the morbid process is embarrassing. The name which seems to Laborde to express most faithfully the *ensemble* and the final goal of the phenomena which constitute the pathological process would be *necrosis*. But this

* 'Le Ramollissement et la Congestion du Cerveau principalement considéré chez le vieillard,' Paris, Ad. Delahaye, 1866.

term, when used in ordinary pathology, implies that the perishing part retains more or less of its external *form*, while in ramollissement it is very often impossible to detect the original form and appearance of the affected part. He proposes to adopt the term *neurobrosis*, which Virchow has suggested for those tissue changes which end in softening. Laborde considers it would be difficult, and scarcely profitable, to pronounce any decided opinion as to whether the nervous or the vascular change is the prior one; but he is evidently disposed (especially by the constant occurrence of similar vascular changes in old age) to suppose that the primitive disease is in the vessels. As to whether this vascular change is, from the first, *atheromatous*, or whether the atheroma is itself the result of some distinct previous process, *e. g.* of irritation, and whether the production of new morbid element is due to *transformation* of the nervous elements by simple *substitution*, he thinks it useless at present to inquire. He cannot but suppose, however, that the circulating blood must take a part in the production of the phenomena of the disease, and that this part is probably determined by those changes in its composition which accompany the decrepitude of old age. But in what these modifications consist it is impossible for him to say.

A novel anatomical observation which Laborde reports is this—that ramollissement of the surface of the brain seems to be nearly always attended with a similar affection of one or other of the central ganglia. He remarks that in nearly every case of spontaneous cerebral softening, in aged persons, there are both motor paralysis and intellectual disturbance, either of the nature of dementia or of delirium, and these symptoms correspond to a simultaneous softening of the brain-cortex and of the ganglia; this coincidence, so far from being rare, is the rule. Moreover, he has satisfied himself that in the great majority of cases the part of the cortex which is affected will determine the site of the softening in the central ganglia; thus, if the surface of the anterior left lobe be softened there will be also softening of the anterior part of the left corpus striatum, &c. It is obvious, then, that an instinctive connection exists between the central ganglia and the cortical substance; and the circumstances here related prove the correctness of the views enunciated on this point by M. Luys, who asserts the direct communication of the ganglia with the cortex by radiating fibres.

Another very singular theory which Laborde deduces from his observations is that morbid adhesions of the pia mater to the brain-convolutions universally require, as a condition of their formation, a diminished consistence of the superficies of the brain beneath them. He remarks that adhesions between the pia mater and the brain substance in general paralysis and in cerebral softening really only differ in virtue of the narrower localisation in the one case than in the other. He declares that there is no respectable evidence whatever that the material of adhesion is plastic lymph, the result of an inflammatory process. He states confidently that a congestive condition of the membranes invariably makes them *easier* to be stripped from the brain. And, on the other hand, he asserts that adhesion of the pia mater and of the arachnoid can be, and constantly is, produced post mortem by

the simple effects of early decomposition. (!) From the whole circumstances he is strongly inclined to believe that the one thing which will cause adherence of the pia mater is the occurrence of softening of the cortical substance, whether this be pathological or post mortem.

Aphasia.

[The literature of this subject for the years 1865-6 is so extensive that we have been obliged, in despair, to renounce the idea of a general report. We had prepared an abstract which, with all possible condensation, would occupy about four times the space which we can afford. We are therefore driven to selections from the writings of one author, and can only mention the titles of the most important papers by other writers.]

Dr. J. Hughlings Jackson, the chief authority in this country on the subject of loss of speech, thinks that all sorts and degrees of defects—from disorderly articulation to incoherence—which occur in hemiplegia, should be compared and contrasted. He has suggested that the various faults should be included under the generality “Defects of Expression,” as such a term is not likely to fetter inquiry by presuming to give a definition. Cases are to be studied as they show *departures from healthy thought, language, and emotion*, and not as *approaches to “aphasic,”* or other predetermined standard of disease. He says (‘Lancet,’ Dec. 1, 1866), that there are to be met with (in cases of hemiplegia, generally, of the right side) “defects, increasing in range and diminishing in degree from those of articulation to incoherence. And it is not well to exclude defects of articulation from one end and incoherence from the other end of one continuous series of physiological symptoms. All these various defects are disorders in a certain series of cultivated *anatomical possibilities of motor and sensory centres ascending in complexity in inter-relations and in width of associations.*” Again,* “It is in some classes of cases of disease of the nervous system hard to say where obviously motor symptoms end and where the purely mental ones begin. Thus there is (in cases of hemiplegia on the right side) every gradation betwixt, on the one hand, a total loss of power to express ideas, or a loss of knowledge of the relations of words to things, and, on the other, apparently scarcely more than an ataxy of articulation. And sometimes in the same case we find that the patient makes mistakes in words, and also articulates badly. It is not difficult to show that ataxy of articulation and so-called loss of memory for words are really defects of the same kind, and that the loss of the sign the speechless patient had for a thing is the loss of power to reproduce in his organs (in health from his brain, through series of centres, to the end of his tongue), the *movements* he has learned for that sign, or, at least, the ‘motor impulse,’ and that damage near the corpus striatum affects language and thought, not because any so-called faculty resides there (or anywhere, except in the whole brain or whole body), but because more or less of parts which help in making symbols are broken up. ‘When we recall,’ says Bain, ‘the impression of a word or a sentence, if we do not speak it out, we feel the twitter of the organs just about to come to that point. The

* ‘Med. Times and Gaz.,’ June 23, 1866.

articulatory parts—the larynx, the tongue, the lips—are all sensibly excited; a *suppressed articulation* is, in fact, the material of our recollection, the intellectual manifestation, the *idea* of speech.’” Elsewhere Jackson quotes the following from Bain:—“It must be considered as almost beyond a doubt, that *the renewed feeling occupies the very same parts, and in the same manner, as the original feeling*, and in no other parts, nor in any other manner that can be assigned.” Again, —“For every act of memory, every exercise of bodily aptitude, every habit, recollection, train of ideas, there is a specific grouping or co-ordination of sensations or movements, by virtue of specific growths in the cell-junctions.”* Jackson speaks† at length of the local disorder of movement, which he calls ataxy of articulation, and urges that, to the ear, it differs from the lame talk of obvious palsy of the tongue, lips, &c., as the gait of locomotor ataxy does, to the eye, from that of paraplegia. Elsewhere he urges its difference from the defective talking caused by paralysis of the palate alone, or of the tongue alone. Ataxy of articulation is a defect in an evolution of movement, which is above those of tongue or palate, but below those for making words. Broca and Fournié hold essentially similar opinions. Jackson‡ holds that the degree of the disorders of language depends on the quantity of brain damaged about the highest point of the motor tract, the point of emission of the orders of the will to the muscles. Dr. Dunn had some time ago made a remark to the same effect. Jackson believes that the so-called “faculty” of language has no separate existence, and that disease near the corpus striatum produces defect of expression (by writing, words, and signs), because this is the way out from the hemisphere towards organs which the will can set in motion. He also believes that disease of the convolutions near the corpus striatum is the cause of chorea, which, as regards the limbs, is not so much a disorder of mere movement as a disorder of those movements which are voluntary and educated. It is not an unimportant fact that chorea is a rare disease either before voluntary movements have been learned or after they have been fully acquired. Unilateral epilepsy seems to replace, and sometimes to displace, chorea, and both run into hemiplegia occasionally. Indeed, it is probable that unilateral paralysis, unilateral irregular movements, and unilateral spasm, are allied, inasmuch as all are deviations from the healthy state of the same vascular region—that of the middle cerebral artery—in which the corpus striatum lies.

Dr. Hughlings Jackson believes that from the corpus striatum another series of fibres for movements start, and that their groupings are (possibly) integrated by the blood-vessels. In the ‘Med. Times and Gazette,’ Jan. 28, 1865, he relates a case of ejaculations after chorea, and remarks—“We have here (1) involuntary ejaculations; (2) involuntary yet complete actions; and (3) local spasm or twitching of muscles. We may find all shades, degrees, and analogies, between obvious and coarse motor-reflex actions and disorders of what Dr. Laycock calls the reflex function of the brain; and we may thus analyse with some success, from

* ‘Fortnightly Review,’ February 1, 1866. † ‘Lond. Hosp. Rep.,’ 1865, p. 315.

‡ ‘Lancet,’ Nov. 26, 1864.

the study of phenomena which are superficial and simple, more hidden and intricate conditions of mind." Elsewhere, Jackson refers to Herbert Spencer's 'Principles of Psychology,' and especially to the chapters on the "Growth of Intelligence," "Reflex Action," "Instinct," and "Memory," in confirmation of his views. He thinks that a study of Spencer's works will show the extreme importance of investigating the whole of the physico-psychical symptoms we meet with—in connection with hemiplegia to begin with—from those grossly motor, as defects of articulation, to those purely "mental," as incoherence. He refers to temporary losses of speech, which he had called "epileptic aphonia," and compares and contrasts them with sudden losses of sight, which he has been used to speak of as "epilepsy of the retina," or "epileptiform amaurosis." He alludes to the case of a boy who had an attack of convulsions of the *right* arm and leg and the right side of the face, with *inability to talk*, although consciousness was not obviously affected. Now, as paralysis of the right side of the face and of the right arm and leg, with permanent loss of speech, are sometimes due to plugging of the middle cerebral artery, it may be well, Jackson thinks, to inquire whether the temporary symptoms in the above case were not due to some temporary cause (possibly spasm of the vessels) in the range, or beginning in part of the range, of the left middle cerebral artery. He speaks* of a case of unilateral (right) chorea in which there was defective talking; but he allows that the nature of this defect of speech requires investigating further, and he remarks that chorea patients can often overcome it by voluntary effort, and also that defective speech sometimes accompanies *left* unilateral chorea. He remarks that in bad cases of defect of expression the fault is not merely one of language, but sometimes of power to execute commoner voluntary action. There are† two modes of expression, one emotional, and the other intellectual. By one we show what we feel, and by the other we tell what we think. We may show that we are surprised, angry, grieved, or astonished by the former, but by the latter we give to another by signs (generally words) a notion of our thoughts on things. Now, in some cases of disease of the hemisphere (always, in Jackson's experience, near to and involving the *left* corpus striatum) intellectual expression is wanting, and emotional expression is well preserved. But we may make the statement broader still, at least in some cases. In some cases of defect of speech the patient seems to have lost much of his power to do anything he is told to do, even with those muscles that are not paralysed. Thus, a patient will be unable to put out his tongue when we ask him, although he will use it well in semi-voluntary actions, *e. g.* eating and swallowing. He will not make the particular grimace he is told to do, even when we make one for him to imitate. There is power in his muscles and in the centres for the co-ordination of muscular groups, but he—the whole man, or the "will"—cannot set them a-going. Another thing is often to be observed—that a hemiplegic patient can close the eye on the non-paralysed side, whether it be right or left, when the other is open, but not *vice versa*.

The distinction made between (1) voluntary and (2) involuntary gross

* 'Med. Times and Gaz.,' June 23, 1866.

† 'Ophth. Hosp. Rep.,' v, part iv.

movements is often exemplified by the finer and more complex movements of speech. (1) The voluntary conveyance of a proposition; and (2) the utterance of an ejaculation, whether this be simple, as "Oh!" or compound, as "God bless my life!" Some of these "speechless" patients *swear when vexed*, though when calm they cannot voluntarily repeat the phrase. Jackson dwells at some length* on the difference between the ejaculations, which are the framework of emotional language, and true power of speech, which is something quite distinct. Speaking of the condition of aphasic patients,† he gives this further summary:—Thus, then, (1) the automatic movements, as of respiration—those semi-voluntary, as swallowing—the emotional actions, as smiling; the secondary automatic processes, as for swearing and interjections—are met with in these patients. (2) On the other hand, the conveying of propositions in bad cases, the execution of other simpler voluntary actions, is lost or impaired. Then, in some cases, patients usually speechless manage, at rare intervals, to get out a sentence which actually carries a proposition and conveys their meaning. This is a wavering betwixt the two groups. In final illustration of the first of these points, we may make the following quotation:—"Of course, we do not either speak or think in words or signs only, but in words or signs referring to one another in a particular manner (see Waitz's 'Anthropology'). No more do we move single muscles, but muscles co-ordinated to a particular end. Indeed, words in sentences lose their individual meaning—if single words can be strictly said to have any meaning—and the whole sentence becomes a unit, not a word-heap." So, however largely the automatic element may enter into our speech, single sentences are voluntary units in the sense that determined movements of the arm are. * * *

"Now, strictly speaking, speech is rarely quite lost, in the sense of there being inability to utter any articulate sounds at all, except soon after the attack. 'Yes' and 'no' (the movements for which, although acquired, are movements almost as automatic as smiling) are the words generally left. 'Yes' is often little more than the expression of a general state of pleasure, and therefore has close affinities with emotional actions, and may be developed by a similar general prompting. It is only when used to convey formal assent to a particular statement that it seems to embody a proposition. Many of our words and phrases are of this kind, although, perhaps, swearing is the most striking instance of all. Such exclamations and phrases have become, as it were, naturalised, and assert themselves with native actions due to general states of feeling without the call of the will, and some interjections are uttered almost in spite of it."

The following have been the other principal papers on aphasia during 1865-6:

The discussion at the Academy of Medicine, in which the opinions of MM. Trousseau, Bouillaud, Parchappe, Lelut, Piorry, Baillarger, Bonnafont, and Cerise, were elicited, may be read at large in the 'Bulletin de l'Académie,' or in the 'Arch. Gén.,' 1865, i, pp. 629, 724, 727, 731, 740, and ii, pp. 102, 108. Of English papers the most important are, Gairdner, on the function of articulate speech (Glasgow, pamphlet, 1865). Sanders,

* 'Med. Times and Gaz.,' June 23, 1866.

† 'Lancet,' Feb. 17, 1866.

a case of aphasia, with post-mortem ('Ed. Med. Journ.,' March, 1866). W. Moxon, a new (and very important) theory of the origin of aphasia ('Brit. and For. Rev.,' April, 1866). Wilks, in the paper on nervous diseases ('Guy's Hosp. Rep.,' 1866).

Cerebral Inflammation.

Dr. Max Leidesdorf and Dr. S. Stricker* have made some new investigations of the microscopic appearances in foci of traumatic inflammation in the brain. Their experiments were made on young chickens. The general results are summed up as follows:—In the focus of a traumatic parenchymatous inflammation all the cellular elements contain nuclei of new formation, which for the most part have a fatty character. Moreover, a part of these elements are in relation with fibres which are in all probability newly formed, or rather newly injected. The nuclei, always small, and sparingly scattered through the fibres in old inflammatory foci, prove that, with the progress of fibre-formation, the nuclei become smaller, and finally disappear. The anticipation of the whole type is seen in embryonal life. Every embryonal cell is, at a very early period, a nuclear cell. But it is an established fact in embryology that the contour line which surrounds the nuclei corresponds to a membrane. The history of development has thus passed through stages which it is to be hoped that pathological anatomy will also attain to, as soon as the observers begin to study nuclear cells more in the living than the dead subjects. The embryonal cell may manifest its vitality in two directions—either it divides or it changes its form. In the latter case it may send out nucleated processes; the nuclei are absorbed again, and the fibres remain. The appearance of fatty nuclei appears to be the first sign of the change, the transformation of cellular elements into fibres the ultimate stage of the process.

On the subject of chronic inflammation of the brain Dr. Steigert† writes an elaborate paper, in which he maintains that he has practically discovered a new disease. [We regret that it is impossible to find space for a long abstract of this paper which we had prepared.] Steiger says that people are too apt to think of encephalitis as a process which can only end in suppuration and abscess; but, in fact, there is reason to think it often takes a slow course, and tends rather to induration. The symptoms which have enabled him to diagnose the existence of chronic encephalitis, in a considerable number of cases, are chiefly the occurrence of partial, sometimes very slight, local palsies, and also a peculiar *change in the urine*. The diagnostic characters of this secretion are (1) low specific gravity (1010-15, without any albumen); (2) diminution of *brown* colouring matter; (3) diminution of urea and uric acid; (4) diminution of sulphates and alkaline phosphates; (5) increase of earthy phosphates, which are present, not in the usual form of acid or neutral salts, but as *basic salts*. The urine remains acid after considerable exposure to air. As soon as ever the basic earthy phosphates begin to disappear the symptoms of encephalitis diminish. The treatment of the disease is by iodide of potassium, which seems to have been always successful in Steiger's hands.

* 'Moleschott's Untersuchungen,' x, 3, 1866, p. 322.

† 'Würzburg. Med. Ztsch.,' vi, 6, 1865, p. 383.

On the subject of abscess of the brain the most important paper is that of Dr. Gintrac, which is based on a collation of 206 cases of this affection, and a careful comparison of them with 157 cases of acute red softening.* [See also other papers in the general index of nervous diseases.]

Ophthalmoscopy in Brain Disease.

On the subject of the diagnosis of meningitis and of many other brain affections by the ophthalmoscope, Dr. Bouchut† has written a book which is much too voluminous to allow of analysis here.

M. Gayet‡ reports a case which shows the value of ophthalmoscopic examinations in brain disease. A young man, æt. 27, had suffered, two and a half months before Gayet saw him, a severe fall, and a great fright thereupon. His health failed, his sight began to grow feeble, and he had noises in his ears. Intelligence was uninjured; he suffered from intense headache and constipation. On examining the optic papillæ with the ophthalmoscope (besides the morbid appearances which were common to both eyes), Gayet found at the upper and outer part of the papillæ (image reversed) a slight grey cloud marking the edge of the disc, and a group of vessels running in that direction. This was recognised as a papillary œdema, *a sign of exudation at the base of the brain*, according to Liebreich. Epileptiform attacks and tetanic rigidity of the limbs soon came on; in the intervals of these fits there was profound coma. The patient died three and a half months from the date of the accident. At the autopsy two spots of red “gelatiniform” softening, with recent hæmorrhage, in the anterior lobe of the right side, and a similar one in the anterior portion of the corpus callosum. All round the foci of softening the brain matter presented a gelatiniform appearance; the remainder of the brain was œdematous and markedly spotty (*piqueté*). No lesion of the optic thalami, the tubercula quadrigemina, nor around the auditory nerve. A slight flattening of the right optic nerve was the only thing worth notice.

Cerebral Hemiplegia.

One of the most important speculations which has of late years been propounded with regard to brain diseases is put forward by Dr. Broadbent.§ He endeavours to account for the singular fact that in common hemiplegia, dependent on hæmorrhage or softening in the corpus striatum or optic thalamus (or both) of one side, it is only the limbs, tongue, and face, which are paralysed, while the trunk muscles escape; and sensation is either partially or altogether unaffected. He thinks the explanation is to be found in the following hypothesis:—“Where the muscles of the corresponding parts on opposite sides of the body constantly act in concert, and act independently either not at all or with difficulty, the nerve-nuclei are so connected by commissural fibres as to

* ‘Journ. de Bordeaux,’ June, 1866; ‘Schmidt’s Jahrb.,’ 130, 4, p. 21, 1866.

† ‘Du Diagnostic des Maladies du Système nerveux par Ophthalmoscope,’ 8vo, avec un atlas, Paris, 1865.

‡ ‘L’Union Méd.,’ 27 Mai, 1865.

§ ‘Brit. and For. Med.-Chir. Rev.,’ April, 1866.

be *pro tanto* a single nucleus. This combined nucleus will have a set of fibres from each corpus striatum, and will usually be called into action by both; but it will be capable of being excited by either singly, more or less completely according as the commissural connection between the two halves is more or less perfect." The existence of these transverse commissural fibres is not hypothetical; it has been observed and described, and is supposed necessary to harmonious action; but as yet it has not been suggested that their use is to convey an impulse from one nucleus to another. If the hypothesis of Broadbent be correct, it ought to be found that the paralysis in any given set of muscles is exactly proportionate to their individuality of action and their independence of the muscles of the other half of the body. And, secondly, that when any set of muscles having a certain degree of independence partially escapes paralysis through association with muscles of the opposite side, *associated* movements only are possible on the affected side, and not independent unilateral action of these muscles.

Broadbent proceeds to prove by reference to clinical facts that these things do absolutely occur. The extreme instance of independent unilateral motility is affected by the arm and the leg, and these are just the parts which are always paralysed. An extreme instance of dependence, on the contrary, is afforded by the muscles of the eye; the two nuclei for these muscles are really practically fused into one, and these muscles are *never paralysed by mere disease of the central ganglia*. The muscles of the neck, back, and chest, are equally exempted in hemiplegia, and the only one of these sets of muscles whose exemption is difficult to explain on Broadbent's theory are those of the neck, in respect of the *rotatory* movements of the head. It is true that in these movements no two *corresponding* muscles of opposite sides are engaged. Yet these are associated with muscles belonging to opposite sides of the body; *e.g.* in turning the head towards the right shoulder the left sterno-mastoid anteriorly, and the right inferior oblique atlo-axoid posteriorly, are brought into action. And it is very probable that the nuclei of the sterno-mastoid and atlo-axoid and of the inferior oblique are connected, the former receiving a branch from the spinal accessory. In this case there would still be an indirect channel open for the influence of the healthy corpus striatum. It is, unfortunately, impossible for us to analyse Broadbent's examples by which he supports his hypothesis *seriatim*. The whole paper will, doubtless, receive very serious attention from physiologists and pathologists.

A paper by Uspensky* introduces novel and important considerations in regard to brain-function, which would, if sustained, have an influence on the differential diagnosis of the various paralyses of cerebral origin. The author quotes 4 cases in which hemiplegia was accompanied by alterations of temperature in the palsied parts. In the first case there was palsy of motion and less complete palsy of sensation in the right half of the body, and a curious reflex excitability—smart percussion of the skin, either of the skin of the right or of the left side (anywhere except on the head or in the flank) produced convulsive action of the muscles

* 'Virchow's Arch.,' 1866, 2, p. 301.

of the right side. The temperature of the palsied parts was on the average $1\frac{3}{4}^{\circ}$ Cent. below that of the other side, and sometimes the difference was as much as 4° Cent. In a second case there was complete hemiplegia, loss of motion and sensation, impairment of intelligence, contraction of the pupil on the palsied side, and an entire absence of all reflex excitability of the paralysed muscles. The temperature of the paralysed side was constantly from $\frac{1}{2}^{\circ}$ to 1° Cent. *higher* than that of the other side. The case terminated fatally in 3 months, and after death softening of the brain-substance external to the left lateral ventricle was discovered. These 2 cases will serve to explain the conclusion which Uspensky draws from his whole series of observations, and from some experiments which he has made on animals. He believes that there are vaso-motor centres in the brain (and probably in the situation of the softening in the second case above related). In the first of the 2 cases now quoted he supposes that there was an irritation of the vaso-motor centre, and consequent anæmia and low temperature of the dependent portions of the body; in the second case, on the contrary, there was paralysis of the vaso-motor centres and hyperæmia, with increased temperature of the dependent parts. The experimental part of Uspensky's researches, however, gives but feeble support to his deductions from this pathological fact.

Dr. Wilks* makes some remarks on the vexed question whether paralysis may be caused by disease of the surface of the hemispheres (especially instancing the case of arachnitis), without affection of the central ganglia. He thinks that there is considerable evidence in favour of the possibility of this. He also instances a case in which there was hemiplegia, with febrile symptoms, but without distinctive signs of arachnitis, and in which after death the whole cineritious matter of the affected hemisphere was found to be in process of disintegration. He observes that in the case of arachnitis with hemiplegia there is always room to doubt whether the central ganglia are not also diseased, and instances 2 cases in which this was found to have occurred. [In connection with this question of the possibility of hemiplegia without central disease, it will be henceforward important to remember Laborde's assertion, above quoted,† that superficial brain disease often appears to depend on primary central disease, and that it may be this is always the case, though the latter affection is overlooked.]

Dr. Hughlings Jackson‡ has some remarks on hemiplegia from disease of the pons. The chief means of diagnosis are the facts supplied by paralysis of certain cranial nerves. He refers to a case which he has recorded in the 'London Hospital Reports,' in which there was paralysis of the left arm and leg and of the right facial nerve, and deafness on the right side. The right pupil was contracted. He relates 2 fresh cases; in the first the paralysis passed off, in the second it was prominent. The following are the particulars of the second case:—Ann B—, æt. 54, an out-patient of the London Hospital, September, 1864. The whole of the face on the right side was paralysed, the arm and leg on the left. The right external rectus was paralysed. There was also rolling of

* 'Guy's Hosp. Rep.,' loc. cit.

† Vide *suprà*, p. 107.

‡ 'London Hosp. Rep.,' ii, 1865.

the eyeballs, which rolling Jackson believed to be due to some paralysis of the 4th nerve. The sensorial symptoms were equally striking and important. The sensation on the paralysed side of the face was not affected, but on the non-paralysed side it was diminished. It was only diminished in certain regions, however, viz. in part of the cheek and forehead, but not about the chin or temple. The part of the cheek supplied by the cervical plexus was affected, and the neck was slightly anæsthetic. The masticatory muscles appeared to act well. The right pupil was a little smaller than the left, but neither of them was abnormally small. There was some irritation of the left eye, but this was due to old disease of the lachrymal sac. The arm and leg were very anæsthetic, but some pinching with the nails could be felt. Dr. Jackson then notes the absence of contraction of the pupils, of deviation of the tongue, and difficulty of swallowing, and of aphonia. Articulation was a little muffled from the facial paralysis. There was no affection of any one of the nerves of special sense, not even of taste. At the patient's first visit sugar was found in the urine, but not on subsequent examinations. Jackson expressly notes that he *could not detect* any paralysis of temporal and masseter muscles at the patient's first visit. At a subsequent visit, however, a month later, the masseter and temporal muscles of the right side were found to be paralysed. Jackson remarks that, "In the last case under my care, the 6th nerve being affected, the disease, no doubt, involved the muscles of the facial nerve; for, as Stilling and Lockhart Clarke had shown, this nucleus is also the nucleus of the 6th nerve. The most curious point about the case is as to the affection of the 5th nerve. The motor part of this nerve was paralysed on the right and the sensory on the opposite side. Dr. Weber, who has written a most valuable paper on disease of the pons Varolii ('Med.-Chir. Trans.,' xlvii, 1861), relates a case of hemiplegia from disease of this part of the brain, in which the 5th nerve was paralysed, but in a different way. In Dr. Weber's case there was paralysis, of the facial nerve, and both divisions of the 5th were affected on one side—of course, the side opposite the paralysis of the arm and leg. Dr. Weber had an autopsy in this case, and found that the neighbourhood of the apparent origin of the 5th nerve was implicated in the pons. Compound granular bodies and isolated granules, and an exuberance of wavy fibrous tissues running longitudinally. There were also numerous corpora amylacea, &c. &c. In short, there were very nearly the changes of *locomotor ataxy*; not quite the same in nature, perhaps, but identical in position."

On the curious subject of lateral deviation of the eyes in hemiplegia, see, especially, J. L. Prevost, 'Gaz. Hebdomadaire,' 1865, p. 649. Other papers are—

G. Humphry (case of Professor Whewell), 'Lancet,' March 17, 1866; J. R. Reynolds, 'Lancet,' April 21, 1866; Broadbent, 'Lancet,' May 5, 1866; J. H. Jackson, 'Lancet,' April 21, 1866, and 'Ophth. Hosp. Rep.,' v.

Functional Paralysis.

Dr. C. Handfield Jones, in his Lumleian Lectures* (1865), speaks,

* 'Med. Times and Gaz.,' ii, 1865, pp. 1, 55, 109, 163, 217, 411, 489, 513, 567, 621.

first, of primary functional paralysis, from direct exhaustion of the centres without physical change, and, secondly, inhibitory paralysis. With regard to the first affection, after establishing the reality and frequency of its occurrence by many striking examples, he comes to the following conclusion:—Primary paresis of ganglion-cells in the nerve-centres, encephalic, spinal, or sympathetic, is a condition of rather frequent occurrence; it is commonly the result of enfeebling or prostrating influences acting for a longer or a shorter time; that its phenomena may set in suddenly; they are not dependent on local or general anæmia, or on a reflex irritation. This paresis is attended with no visible structural lesion in the early days of its existence; but if prolonged considerably it may become complicated with atrophic degeneration; and the remedies suited to it are generally all such as can excite and maintain nervous power—sufficient rest, good food, pure air, nervine remedies, cod-liver oil, electricity. Jones thinks it evident that, if these conclusions are admitted, we must regard functional nervous paresis as a form of nervous disorder most deserving to be recognised in our nosology, and not merely tacitly admitted as matter of probability. He believes that further consideration and experience will show that this conception of paresis will, to some extent, replace those of effusion and congestion which have been so largely invoked.

On the subject of inhibitory paresis Jones remarks that all the causes which appear to induce this affection are such as are likely to exert a depressing effect on the nervous centres. Over-strong currents of electricity, cold and wet, intestinal worms, fæcal accumulations, gastric, cutaneous, uterine irritation, diseased teeth, and the like, must be regarded as directly depressing; and the special effect which they produce on the centres must greatly depend on which part is weakest. The depressive power they exert seems, *ceteris paribus*, to fall usually on the *nearest* nerve centres, but difference in strength and nutrition may cause a remote centre to be affected by preference. Stronger centres recover at once as soon as the morbid impression is removed; weaker ones more slowly, and sometimes not without the aid of tonics and restoratives. Jones remarks that the vaso-motor system is affected with far greater frequency, in an inhibitory manner, than other tracts of the nervous system.

Vaso-motor Affections.

Dr. Nothnagel* describes a series of cases of which the general type is as follows:—The seat of the malady is exclusively the hands and forearms, usually on both sides, but generally the affection is more developed on one side than on the other. The onset is usually gradual, but occasionally sudden. A feeling of numbness and sleepiness succeeds, and this is soon accompanied by anæsthesia of varying degree, with a sensation of cold. Then come neuralgic pains in all the anæsthetic parts, which cannot be referred to any distinct nerve. The diminution of temperature could be established by the thermometer when the two limbs were unequally affected; the worse one was found to

* 'Arch. f. Klin. Med.,' ii, 2, pp. 173, 166; 'Schmidt,' 1866, 11.

have a lower temperature by $\frac{1}{4}^{\circ}$ to 2° Cent. than the other. Motility is not injured, only the finer movements are impaired in consequence of the defective sensibility. If subjective symptoms increase, especially if neuralgic pains occur, the fingers and hands take a chalk-white pallor; this is especially the case at the time of waking, also under the influence of cold, especially cold water. Exacerbations occur also at night (especially of itching), also when fine manual work has been performed, but still more when the hands have been perfectly inactive. On the other hand, the symptoms diminish on stimulation of the skin, with fatiguing work, and especially by working only in warm water. With these variations the condition may last for years.

All the patients were women, and they ascribed their malady to the influence of cold, especially cold water. Dr. Nothnagel believes that the essence of the morbid state is spasm of the arteries of the skin. The spasm does not extend to the radial artery, for the calibre of this is never altered during the exacerbations, nor are there any of the congestive phenomena which obstruction of such large vessels must produce, nor any damage to motor functions. The prognosis is good if suitable treatment be adopted. Heat, friction, Faradisation, and, above all, the constant current (15—20 Daniell's cells, modified by Siemens-Halske), the positive pole being placed on the brachial plexus, the negative on the nape of the neck, for from three to five minutes without interruption. This is to be done three or four times a week. From six to twenty *séances* will suffice for a cure.

Convulsive and Spasmodic Affections.

On the subject of partial and temporary catalepsy M. Lasègue* makes some interesting statements. He commences with an outline of the physiological conditions of voluntary motion, and then analyses the cataleptic phenomena. The classical catalepsy, characterised by loss of consciousness without disturbance of respiration or circulation, total insensibility to impressions, cessation of all voluntary motions, and tendency to indefinite retention by the limbs of artificial attitudes in which they may be placed, is only observed in persons of an intensely hysteric temperament. Lasègue observed it as often as ten times in one year among the numerous hysterical females who applied to him for medical advice. It is limited, however, to a single class of hysteric patients, those, namely, who are half torpid, with little power of reaction, and with more inclination to tears than to excitement. If one lays one's hands on their eyes, and closes the lids, they feel a peculiar drowsiness, and presently pass into the deepest sleep, from which hardly any stimulus will rouse them. According to idiosyncrasy these symptoms are more or less intensely developed. During this state a wax-like flexibility of the limbs exists. The muscles are in a constant state of tension, of various degrees, but (in the same person) always in relation to the extent of the passively extended muscle. The cataleptic rigidity is general or partial, complete or incomplete, more or less fugitive. In general, it is proportional to the depth of the lethargy.

* 'Arch. Gén.,' p. 386, Oct. 1865.

The upper extremities are generally more intensely affected than the lower; sometimes only one half of the body is affected. The catalepsy is also independent of the loss of muscular sense and of anæsthesia of the skin. It disappears as soon as the patient wakes. The patient has sense of fatigue; she knows that she has slept, but is not conscious how long sleep has lasted. There are also individuals, among the torpid kind of hysteric patients, who only fall into the comatose condition, but never have cataleptic rigidity. In these the lethargy is always preceded by struggles like those seen in chloroformization. Other patients exhibit exceptional cataleptic phenomena. Lasègue observed two adult men who suffered from a general apathy, weakening of sensibility and motility, and in whom post-mortem examination showed nothing abnormal in the brain. Both, and especially one, exhibited very pronounced cataleptic rigidity as soon as any one closed their eyes. One of them fell at such times into the deepest somnolence, the other did not sleep. A third case was distinguished from both of these. A young man, who had often suffered from fainting fits, after a very long and severe faint, experienced a very intense pain beneath the left breast, increased by movement. Careful examination showed that all the left half of the body was hyperæsthetic and palsied; the right side was analgetic, but retained full voluntary power. Feeling, both of active and passive movements, was quite intact. On closing the patient's eyes he fell into a deep sleep, and the whole left side became markedly rigid. The patient was bled, and in a few weeks recovered his normal condition.

Dr. Wilks* puts forward an important opinion as to the seat of epilepsy, and of epileptiform convulsions generally, arguing very strongly that these affections are more probably due to a fault in the cortical substance of the hemispheres than in the central ganglia.

Spasmus alternans transversus is the name given by Remak† to a curious affection observed by him. The patient was a man æt. 22. Three years before coming under treatment he fell from a height of fifteen feet without receiving any notable injury, though stunned at the time. On recovery he felt weak, and from that time had been dyspeptic. After trying various remedies for the dyspepsia for about three years, he was persuaded to try the water cure, and the present affection appeared two months later. The patient when walking was attacked, every three or four steps, with convulsion which passes over him crossways in this manner—the right arm involuntarily becomes elevated to a horizontal line, while the forearm is bent, and apparently the left leg is rising; but a more minute examination shows that the left leg during the elevation of the right arm remains hanging, not through palsy of the ilio-psoas, but through convulsion of the glutæi, as the patient himself feels the traction backwards, and as the sudden jerking of the leg towards the same direction is visible. The thigh is pulled behind, by which means the top of the foot remains on the ground; the step is thereby retarded, causing the patient to stagger, but not to fall. Thus, the convulsions arise crossways synchronously in the muscles of the

* 'Guy's Hosp. Rep.,' 1866, loc. cit.

† 'Lancet,' April 8, 1865.

left shoulder and in the right glutæi. At the time when this patient first came under Remak there was also a second series of convulsions, which arose in the right shoulder and passed into the left foot; but the application of the continuous current caused the right arm to be entirely at rest, while in the left leg and in the glutæi traces of the past condition, though rarely, are to be found. The attacks also occur whilst the patient is sitting, although the action of the glutæi is not so apparent as when he is standing. Pupils regular; general health good, but for the stomach disorder, and also a slowness and difficulty of speech. Patient says his memory and intelligence are unaffected. Slight anæsthesia, only in palm of right hand, but this has already disappeared. Remak thinks that the pyramids participate in the phenomena, where the nerves cross which from this point descend through the pons to the upper and lower extremities. Besides this there lies at the same level Stilling's nucleus of the vagus, which may be considered the cause of the dyspepsia and anorexia, and near by the nucleus of the hypoglossus and the olivary body, from which the difficulty of speech may be derived. Remak remarks that these affections are as unknown as are the changes which they undergo. The continuous current was bringing about rapid improvement at the time the above clinical history was written.

Reflex neurosis of the vagus, in which the irritation begins in the periphery of the trigeminal nerve, is illustrated by some cases of Dr. Lederer's.* He has now seen 3 cases in which the adaptation of an artificial tooth produced violent effects on the vagus. Of the 2 which he now publishes, in 1 the patient was a healthy young girl of 22. The operation was followed by malaise, vomiting of all food, and most severe and continuous convulsions. Various remedies were vainly tried; at last the artificial tooth was removed, shortened, and replaced; all the symptoms at once completely disappeared. In the other case the operation was followed by shivering, severe pain at the pit of the stomach, vomiting, and finally diarrhœa, followed by exhaustion and sleep. There were no local symptoms in either of Lederer's 3 cases.

Remak,† in another paper, says that he has often observed the occurrence of a peculiar neurosis of the heart in connection with disease of the last molar tooth of the lower jaw. The mouth is closed, partly by muscular spasm, partly by swelling of the condyles. After a time the pulse is greatly accelerated, and the heart beats strongly; there is much precordial distress. Remak believes that these cardiac symptoms are due to irritation conveyed from the diseased tooth to the superior cervical ganglia of the sympathetic. The constant current was applied to the angle of the jaw, and the rapidity of pulse and (later) the contraction of the jaw-muscles yielded to this treatment.

Dr. W. R. Sanders‡ relates a case of "dystaxia, or pseudo-paralysis agitans." The patient had sustained fracture of the leg, and injury to the knee, head, and dorsal region of the spine, in a fall some months previously. The present symptoms were the result of a second fall,

* 'Wien. Med. Presse,' xxiv, 1866; 'Schmidt's Jahrb.,' B. 132, p. 159, 1866.

† 'Berlin Klin. Woch.,' 1865.

‡ 'Edin. Med. Journ.,' May, 1865.

when just recovered, in which apparently no injury was sustained, except that the patient experienced a great fright. The muscular movements, which began at once on the second fall, bore a general resemblance to those of chorea, but the case really differed entirely from this affection. The movements were shaking, oscillating to and fro, by the alternate action of antagonistic muscles; they repeated themselves rhythmically when once begun (which only happened when the patient was excited or attempted to perform some muscular action), and were usually symmetrical. There were no choreic grimaces, and the age and appearance (the man was 35 years old, and a fairly robust labourer) were different from those observed in chorea. Sanders concludes—1. That the case was one of functional disease of the spinal cord, allied to chorea (spinal chorea?). It is not paralysis nor ataxia. 2. The disorder belongs to the class “tremores,” and is of the kind sometimes called “paralysis agitans” (non-senile), but from the absence of muscular palsy it cannot be so named correctly; it may be called dystaxia, or scelotyrbe agitans, or, perhaps better, pseudo-paralysis agitans. 3. In the form and to the extent presented in this case it is a rare affection, as existing independently of old age, mercurial poisoning, great debility, or organic disease of the cerebro-spinal axis. 4. It probably depends on a weak and excitable condition of the motor centres in the spinal cord, due to anæmia of its grey substance. 5. The predisposing cause of the disease was the accident the patient met with by the first fall. The exciting cause was the fright occasioned by the second fall. It is not likely that the ague or the rheumatism, which had been cured so many years, had any share in its causation.

The so-called “Restraint Neuroses.”

Drs. Eulenburg and Landois discuss this subject in a series of papers.* They consider that the researches of physiologists have proved the existence of four systems of inhibitory nerves:—1. The cardiac (Weber and Budge). 2. The respiratory (Rosenthal). 3. The intestinal (peristaltic, or Pflüger's). 4. Those which restrain the reflex movements. There are four kinds of neuroses corresponding to these.

1. The neuroses which affect the cardiac inhibitory nerves are concerned with the vagus of one or both sides. The irritation may be excited at many different points, but is most commonly not direct, but reflex, in its action. Direct irritation most frequently takes place in the peripheral branches of the vagus, in the heart itself. When it is of central origin other symptoms of such violence are produced that the signs of vagus irritation are apt to be masked; and the same thing occurs in the action of the so-called cardiac poisons and in complex brain disorders. A certain class of cases of angina pectoris are neuroses of the vagus.

The best example of a reflex heart-neurosis is given by the famous Klopff-versuch, or crushing-blow experiment of Goltz. Here the irri-

* ‘Wien. Med. Wochensh.,’ 37—41, 1865.

tation proceeds from the sensory nerves of the abdomen; and to this class belong cases of sudden death from catheterism or from concussion of the abdomen, as also cases of angina pectoris produced by irritation of abdominal viscera, and the cardiac depression produced in many cases of wound of the intestine, severe gastritis, nervous gastralgia, intestinal obstruction or intussusception, colic from renal or biliary calculi, and peritonitis; also the slow pulse in lead colic. In all these the first step in the etiological series is paralysis of the abdominal vessels. Other causes of reflex depression of the heart are found in abnormal irritation of the genitals, as in hysteria and onanism.

2. The respiratory restraint neuroses are not so well explained as the cardiac group; nevertheless, the experiments of Rosenthal are positive enough; they show that slight irritation of the superior laryngeal nerve *slackens* respiration, that stronger irritation *arrests* it, and that very strong irritation causes contraction of the expiratory muscles, with the production of cough, which in extreme cases is spasmodic. Thus, the superior laryngeal nerve is the restraint nerve of respiration; its restraining centre is not (like the cardiac) at the periphery, but in the medulla oblongata, and the irritation passes centripetally to this. Many restraint neuroses are caused by the irritation of this nerve, *e.g.* hysterical cough, whooping-cough, and the cough which is provoked by foreign bodies in the air-passages.

3. The restraint neuroses of the alimentary canal are due to irritation of the splanchnic nerves, analogous to that produced experimentally by Pflüger and others. The inhibitory centre to which the irritation is conveyed is probably the plexus between the muscular layers of the intestinal wall, which supplies the intestinal motor nerves. The neuroses of the splanchnic nerves in this manner cause diminution or arrest of peristaltic action; and it is difficult in complicated cases to distinguish between this kind of effect and direct motor palsy of the intestines; there may also be a union of the two. The pain in lead colic is probably due to splanchnic irritation—at least in part. The constipation is also due, in the opinion of Eulenburg and Landois, to this source, and not to spasm, as some suppose, of the intestinal muscles, since in that case it could only occur periodically, instead of assuming that obstinate persistency which it actually shows. The relief afforded by antispasmodics also points to the same conclusion; so does the fact, already referred to, that similar effects are produced upon other restraint nerves, as the vagus. The spasms of the bowel, so far as they are real and not merely apparent, are probably only secondary, and confined to the large intestine, on which the splanchnic nerves have no inhibitory influence; or they may be caused secondarily by the irritation of mechanical distension. The psychical influences which affect intestinal movements (*e.g.* hysteric flatulence) also probably act through the splanchnic nerves; but the course of their action beyond the thoracic sympathetic, and towards the cerebro-spinal centre, is not known with certainty.

4. The restraint neuroses of reflex action are exemplified by the operation of the will in controlling reflex movements. This has long been understood from the phenomena of decapitations; but Setchenno

first demonstrated a restraint centre for this purpose in the corpora quadrigemina of the frog. To the neuroses of this inhibitory system may probably be ascribed many spasmodic diseases, *e.g.* epilepsy, chorea, tetanus, paralysis agitans. According to Malkiewicz, the spasms in poisoning with strychnia, opium, and alcohol, are due to paralysis of this inhibitory centre.

Prof. von Piotrowski* opposes the theory of Landois and Eulenburg, more especially as regards its application to the neurosis of the heart. He is an opponent, both of the theory of separate Hemmungs-nerven, and even more decidedly of the exhaustion (Erschöpfung) theory, which has been proposed as an explanation of the well-known so-called phenomena of inhibition.

In regard to the question of the cardiac restraint phenomena, he rests, in the first place, upon the demonstration by Zenker of a double system of muscular fibres in the heart; the more important of these is internal, and performs the movements of contraction in the transverse diameter; the other or inferior system, to which, for the most part, the musculi papillares belong, lies external to and surround the former, and its office is to contract the heart in its long diameter. According to Piotrowsky, the former system (Haupt-muskulatur) is innervated by the sympathetic, the latter by the vagus. He recalls the observation of Flint, that in tetanic spasm of the heart the external fibres are found wrinkled in transverse folds. He has produced this phenomenon by direct irritation of the vagus, and he observed that the heart was arrested, not in diastole, but in *presystole*. He has no doubt that the external fibres, or Neben-muskulatur, are the cause of that presystole, the existence of which Spring first noticed in 1861.

Piotrowski also maintains that a similar theory explains, while the theory of Landois and Eulenburg fails to elucidate, the phenomena of lead colic. He believes that there are two motor systems for the intestines—the circular fibres, innervated by the vagus; and the longitudinal fibres, innervated by the splanchnic. He believes that splanchnic irritation in lead colic produces tetanus of the longitudinal fibres, and that this renders peristalsis impossible.

Results of injuries to Nerves.

Mr. Jonathan Hutchinson† relates seven cases of surgical or other injuries to nerves, with their observed results. In the comments which he makes upon them the following are the most noteworthy points. In reference to wounds of the ulnar nerve, he remarks that the atrophy of the abductor indicis muscle, which causes the remarkable hollow between the forefinger and thumb which is recognised as diagnostic of division of the ulnar, is evidently not reflex, but direct, since the muscles in question are supplied by the deep palmar branch from the ulnar trunk itself. He answers conclusively the hypothesis that the alterations of nutrition and temperature of the parts supplied by the ulnar nerve, when that is divided, depend upon changes in the blood-vessels, long remarking

* 'Wien. Med. Wochensh.,' 49, 1866; 'Arch. f. Klin. Med.,' ii, 2, p. 172, 1866.

† 'Lond. Hosp. Rep.,' iii, 1866.

that collateral circulation is very soon re-established, whereas the nutrition and temperature changes are found long afterwards. Next to the loss of sensation, the chief result of nerve section is a diminution of temperature. The condition of things in this respect could not be noted in Hutchinson's cases, and he thinks seldom can be noted, so as to exclude fallacies, at early periods after the section. Respecting the state of things some weeks afterwards, he finds no exception to the rule that there is a remarkable loss of heat in the part which has lost sensation. The amount of comparative loss will vary with the external conditions, the heat of paralysed parts being so much at the mercy of external influences. In all Hutchinson's cases the anæsthetic fingers became very blue and cold in cold weather; in several instances he observed this himself. In the warmest temperature they could never be raised to that of the adjacent unparalysed parts. Nor does even the existence of inflammation raise the heat to the normal standard, though it much increases it. In one case the paralysed part was 10 degrees colder than its fellow of the opposite side; inflammation came on, and the temperature rose, but never reached higher than 2 degrees below that of the other hand. In another case both the paralysed and the healthy hand were put in hot water; the difference remained constant, though each hand became 10 degrees hotter. In one case only was a *small* diminution of temperature noticed in the paralysed part. Usually the difference was from 6 to 10 degrees. In discussing the causation of this diminution of temperature, Hutchinson remarks that it is unsatisfactory to ascribe it to disease of the palsied parts, for it is just as marked where one finger is contrasted with the rest of the same hand as when the whole hand is affected. To ascribe it to dilatation of the small arteries, and consequent slowness of the circulation, is scarcely more satisfactory, since paralysis of the vaso-motor nerves, and consequent dilatation of the vessels, produces *increase* of temperature. Yet it is certain that the capillary circulation is in some way greatly disturbed. If you chill the part it becomes, not merely pale, but livid; if you warm it it becomes, not of a bright pink flesh tint, but of a peculiar dull brick-red colour. The most plausible conjecture is, not that the nerve-control over the vessels is at fault, but that the *vis à fronte* is itself much diminished. This would be partly by the atrophy of those parts of the skin which endow it as an organ of sensibility. The papillæ of the skin waste after the sensory nerve has been long cut. Then the nerves themselves will no longer maintain their nutrition, or need so much blood. Probably, however, there is more than this, and the endowments of every cell, in a part no longer connected with the great nerve-centres, undergo change. Under this hypothesis we may suppose that with the diminished energy of nutrition and growth of tissues the *vis à fronte* would be lowered to an extent which would account for the lowered temperature, the slowness of capillary circulation, and the occasional changes of structure. This hypothesis must be left to the judgment of physiologists. Hutchinson admits that the lesions of nutrition which often follow in paralysed parts are frequently the result of accidental influences operating in the defenceless condition of the paralysed organ (*e. g.* inflammation of the eye in palsy of the 5th,

&c.) ; but he thinks it highly probable that the division of the nerve may *directly cause* inflammations of the parts paralysed. In 5 out of his 7 cases the palsied fingers became inflamed, and the inflammation was so similar in all, and so remarkable in some, that it is impossible to believe it to be the result of accident. Thus—the tips of all four fingers inflamed at the same time; a very peculiar form of whitlow, involving the very point of the finger, resulted; it very closely resembled the early stages of senile gangrene. [Hutchinson strongly suspects that many cases of senile gangrene begin from defective nerve-supply.] Several of his cases of division of nerves illustrate the fact that, although paralysed parts are liable to inflame, yet they are capable of good repair. In no single instance did the tendency to inflammation last long. He mentions having recently operated twice on an eye, in a case where the 5th nerve was totally paralysed; in each instance the wound healed well. None of Hutchinson's cases lend any material support to the opinion that nerve-trunks which have been cut are rapidly repaired. He thinks that if such a reparation takes place at all it is a very slow process. Finally, he calls attention to, without discussing, the following facts of interest noted in his cases:—1. That the loss of temperature extends even to a considerable distance above the site of the nerve lesion. 2. Subjective phenomena of nerve section, *i. e.* aching during cold, burning pain when warm, diffused pain in the whole member. 3. The contraction of paralysed muscles. 4. Reflex pain, &c., in the opposite limb.

Mr. T. Nunn* records a case of injury to the ulnar nerve, followed by affections of temperature, &c. A boy, æt. 6½, had his ulnar nerve completely, and his median probably partly, divided in an accident. Two months later the muscles supplied by the ulnar nerve were wasted by one third of their bulk, and the temperature of the hand was 10° Fahr. below that of the sound one. The recovery from this state of things went on slowly but progressively till 4 years afterwards, the date of Nunn's last observation. At this time the muscles had regained their normal bulk, and there was only half a degree Fahr. between the temperature of the two hands.

[Compare with the above observations the extensive experience of Messrs. Mitchell, Morehouse, and Keen, during the American war, as recorded in their 'Report on the effects of Gunshot Injuries to Nerves,' Philadelphia, 1864.]

Therapeutics of Nervous Diseases.

Dr. Brown-Séquard publishes † some lectures on the diagnosis and treatment of functional nervous disease. Under the head of treatment he makes eleven divisions:—I. Means of suppressing the causes or diminishing their intensity. II. Means of diminishing the reflex excitability of the nervous centres. III. Moral treatment. IV. Special modes of treatment in periodical affections. V. Treatment through

* 'Pathol. Transact.,' 1866.

† 'Lancet,' January and February, 1866.

irritation of the sensitive and other incident nerves. VI. Physical and mechanical modes of treatment. VII. Complex modes of treatment, combining the process of irritation of incident nerves and a modification of the blood. VIII. Change of the composition of the blood, and elimination of morbid and other poisons. IX. Special use of anæsthetics. X. Treatment by remedies acting directly on the nervous system, or on the unstriped muscular fibres. XI. Treatment by tonics and other remedies. Under the head of (I) suppression of *causes* he enumerates—(1) Local application of narcotics, in cases where a wound of the skin or a branch of a nerve may be the cause. (2) Local application of ice in similar instances; this plan he thinks especially powerful in the prophylaxis of tetanus after a dangerously exciting wound. (3) Actual cautery to a wound of which the secretions should be altered, or for the destruction of a part which contains venom. (4) Narcotic applications to the trunk of the nerve leading from the wounded part, after laying the nerve *bare*. (5) Section of nerve. This operation, to be of value, must be done early; the nerve must not only be cut through, but a piece of its peripheric end *removed*; if on examination this shows any signs of inflammation, the section must be repeated as much nearer the spine or cranium as the circumstances permit. (6) With regard to operations on the genital organs with a view of curing functional diseases caused by masturbation, Brown-Séquard gives a very qualified and guarded admission that they may be sometimes of use, but decidedly expresses his opinion that in the majority of cases they are of no good. He thinks that it should only be attempted in those cases (of epilepsy, &c.) in which *a distinct aura starts from the clitoris*, or the latter is enlarged and morbidly sensitive. But he thinks the only cure for masturbation in men or women is by forming ulcers on those parts of the genital organs which must be touched in the act. (7) Trephining the cranium, applicable only to cases in which there is a local irritation of the dura mater; and even in such cases very often mere local counter-irritation would have sufficed to produce a cure. (8) Ligature of the carotid is most irrational treatment of functional brain disorders. Doubtless its apparent success in the hands of Preston and others was owing to their having wounded the cervical sympathetic. (9) Operations for the removal of causes of functional nervous disorders—*e. g.* removal of decayed teeth, of tumours, of carious or necrosed bone, which might keep up irritation. (10) Treatment against alterations of the blood, and against visceral disorders. Any diseased organ, if it has any considerable influence over the character of the blood generally, or, indeed, through its mere connection with the nervous system, may cause an aggravated functional disease. It must be cured first of all. (II) Means to diminish reflex excitability of nervous centres, such as persists in epilepsy, hysteria, tetanus, hydrophobia, delirium tremens, chorea, paralysis agitans, and severe forms of reflex insanity. (1) The drugs to be employed are as follows:—Atropine, valerian, and the bromide of potassium, in epilepsy; chloride of barium in tetanus and paralysis agitans; codeine, morphine, and valerian, in hysteria, &c. None of these remedies equals chloroform in immediate effect, but this is transitory; counter-irritation is also ver

useful in diminishing reflex excitability. (2) Anæmia often causes excitability of nerve-centres, and everything that improves nutrition will then be serviceable. (3) It is very important to improve the sleep; an invaluable drug for this purpose is the bromide of potassium. In cases, however, where pain is a part of the cause of sleeplessness, opium, aconite, and belladonna, should be used together. A warm bath of four, five, or six hours' duration, will often cause sleep where the bromide of potassium has failed. (III) Moral treatment. Give the patient's mind a *serious aim*, by means of occupation which is interesting, but not too fatiguing or exciting; idleness is the worst thing. Also give the patient hope. (IV) Special treatment of periodic forms of nervous disease. Brown-Séquard is not referring here to the well-known treatment of periodical neuralgia, epilepsy, &c., by sulphate of quinine and the like, but to a set of cases in which there is a periodical *aura*, and which he treats by making the patient take violent muscular exercise (*e. g.* swinging) when the danger is at hand. In this way a boy was enabled to ward off a great number of successive threatened fits; in this case the cause of irritation was a diseased molar tooth, which had not given pain, but was extracted, when at once the fits ceased. Other modes of changing the state of the nervous system have been proposed—ligature of the limb, pinching the skin, a powerful emetic, cold douche to back, powerful interrupted electro-magnetic current, a dose of quinine (10, 15, or 18 grains) about an hour before the attack; an enema of drastic medicine, the inhalation of chloroform, &c.

Professor J. F. H. Albers* records a number of cases of mental depression, with paralytic affections of the extremities, tongue, and sphincters, in which the inunction of tartar emetic on the vertex produced either a curative or a markedly improving effect. Sometimes it was observed that interruption of the treatment was followed by a relapse. Especially appropriate are the cases which run a chronic course, for the pustulating effect of the ointment requires several days for its production, and the therapeutic influence can hardly be induced under from 8 to 14 days. A copious pustulation appears to be especially effective. The ointment is, therefore, to be frequently rubbed in, even for a month together. Albers uses an ointment with ʒij tartar emetic to ʒj lard. The best place for the inunction is the vertex, by the side of the sagittal suture, especially towards the front, because the middle meningeal artery runs there, and in this district the exudation processes in the membranes tend to localise themselves.

MM. Gubler and Dumont† give a case of very severe chorea, in a woman 5 months pregnant, which was very successfully treated with doses of 30 and 45 grains daily of bromide of potassium. The effect was at once very marked, and the cure was complete in 8 days from the beginning of the treatment.

M. Favez‡ treats of compression of the carotids as a remedy for convulsions. He relates 3 cases of convulsions in which this pro-

* 'Memorabilia,' x, 11, 1865; 'Schmidt's Jahrb.,' 130, 4, p. 23, 1866.

† 'Bull. de Thérap.,' 68, p. 178, 1865.

‡ 'Arch. Gén.,' 6 sér., viii, p. 353, 1865.

cedure appeared to be successful. The first is that of a child, æt. 6, who had violent spasms of the left side of the body, with clenched jaws, bitten tongue, and spasmodic movements of the head. Compression of the *right* carotid stopped the fit immediately; the child fell asleep, and awoke in full consciousness a quarter of an hour afterwards. The second patient was a girl of 7 years; she suffered convulsions of the right side of the body (apparently induced by fright); here compression of the *left* carotid produced equally happy results. The third patient was a child of $2\frac{1}{2}$ years; the convulsions affected both sides; compression was applied to the *right* carotid, and the convulsive movements of the *left* side ceased at once. The *left* carotid was then compressed, and the convulsions of the *right* side ceased. Sleep followed, and in an hour the patient woke up quite well.

M. Bouchut* records 3 cases of progressive general paralysis, with and without insanity, in which nitrate of silver was successfully employed. The first patient was a young man of loose and intemperate habits, who was attacked with weakness of the lower extremities and difficulty of speech. Two months after the commencement of the illness the general aspect was healthy, and there was no very evident insanity; but there was mental cloudiness, loss of memory, trembling of the eyes and tongue, defective articulation, and a tendency to misplace words; inequality of pupils, dimness of sight, trembling of the limbs, staggering gait, trembling and weakness of the hands; no affection of the bladder or of the sexual power; no defect of sensation. Three centigrammes of the nitrate were given daily, with dry cupping to the spine and daily sulphur baths. In 6 weeks there was a great diminution of all the symptoms; in 9 months the cure was complete. After a year's good health the patient was suddenly attacked with monomania of an exalted type, and was sent to an asylum.—In the second case a man, æt. 45, had suffered for 2 years from the most decided symptoms of progressive paralysis of the insane; 2 to 4 centigrammes of the nitrate were given daily. In a fortnight the symptoms were already improved; the legs, hands, and tongue, no longer trembled; the patient could write well, and his articulation was normal. No improvement of the mental condition had yet occurred. An intercurrent congestion of the brain, with unconsciousness and epileptic fits, increased the mental disorder, but did not affect the motor powers. At a later date the mental activity had improved, but memory remained almost *nil*. The patient took the nitrate for a year and a half, in doses varying from 1 to 5 centigrammes daily. A seton was also occasionally placed in the back of the neck.—The third case was that of a man, æt. 48, an old glutton and drinker, who was affected with progressive general paralysis of the insane. Two centigrammes daily of the nitrate diminished the tremblings of the limbs and tongue, but the mental defect remained. The increase of the dose to 5 centigrammes at first caused great improvement, but the case then became stationary, though the dose was raised to 10 centigrammes.

* 'Bull. de Thérap.' 15 December, 1865.

Dr. Böttcher* has used Indian hemp in the most various forms of mental disease; sometimes with transitory effects only, sometimes with improvement, and sometimes producing a complete cure. He says it is especially useful in the prodromata of insanity, where there is pre-cordial uneasiness and loss of sleep; it is more effective than opium, and is useful where opium is contra-indicated. In fully developed cases Indian hemp is the more effective in proportion as there is severe excitement, heightened by hallucinations of sight and hearing. Böttcher uses the (official Prussian) extract and the tincture; of the first, $\frac{1}{4}$ to $\frac{1}{2}$ grain twice daily; of the latter, 15 drops twice a day. He records 4 cases of melancholia with periods of excitement (3 of them accompanied by hallucinations), in which striking effects were produced. In 1 case recovery occurred in 2 months; in a second in 3 months; in a third after long use of the extract of hemp; in the other, which was a relapse, the date of recovery is not specified.

Dr. Lyons† records a case in which he treated delirium tremens by the administration of a bolus containing 30 grains of *Cayenne* pepper. This caused some slight burning in the mouth and throat for a time, but no serious inconvenience, and in less than an hour the patient fell into a sound sleep, from which he awoke some 3 or 4 hours later in a state of convalescence. This case only confirms the results which have been obtained on an extensive scale by Lyons in the West Indies, and also Drs. Kinnear and Lawson in the Melville Hospital. In the latter institution not less than from 70 to 80 cases have been successfully treated with this remedy in single or repeated doses, ranging from 20 to 80 grains. Lyons believes that its *modus operandi* must be a direct influence on the *gastric* expansions of the vagi, and through them upon the cerebro-spinal centres. The phenomena of the disease point to the simultaneous existence of stimulation and paralysis, perhaps, of opposite portions of the nervous system. For general employment the capsicum has many advantages over digitalis, particularly in those recurrent and senile cases which are so often attended with fatty heart.

Other papers on special drugs for nervous diseases are the following:

Benedikt, therapeutic researches with curara ('Wien. Med. Wochtbl.,' 7, 1865; 30, 1866). Besnier, bromide of potassium in epilepsy, &c. ('Gaz. des Hôp.,' 35, 37, 1865). Barrett, S., large doses of digitalis in delirium tremens ('Amer. Journ. Med. Sci.,' July, 1865). Eulenburg, action of quin. sulph. on nervous system ('Virchow's Arch.,' iv, 1865). Greenhalgh and Nunn, iodoform in neuralgia, &c. ('Lancet,' i, p. 208, 1865). Hillier, bromide of potassium in epilepsy ('Brit. Med. Journ.,' May 6, 1865). Murray, use of chloroform in epilepsy ('Med. Times and Gaz.,' April and May, 1865). Peulevé, bromide of potassium in epilepsy ('Union Méd.,' 40, 1865). Thomas, action of digitalis ('Arch. d. Heilk.,' 1865). Bossarie, muscular contraction cured by subcutaneous injection of atropine ('Bull. de Thérapie,' i, 1865, p. 380).

* 'Berl. Klin. Wochenschr.,' iii, 16, p. 166, 1866; 'Schmidt's Jahrb.,' 1866.

† 'Med. Press and Circular,' April 18, 1866.

Electricity in Nervous Diseases.

Professor Remak,* in some lectures delivered at Paris, discusses the subject of the physiological and medical effects of the *constant* current. He believes the constant current to be greatly superior to all other forms of electricity for medical purposes, and that in most cases where it has a happy effect the *induction* current is rather hurtful than useful. The constant current has a more intense and beneficial action than other currents, chiefly because it can be so easily introduced into the body in large quantity and without pain or shock. The principle of M. Remak's manner of applying it consists in using a comparatively small number of elements in the battery, these being, however, of large size. Not more than 32 cells, at the outside (Daniell's cells modified by Siemens and Halske, of Berlin), but weighing 8 pounds each, are employed. In the application of the current to the body, Remak generally uses metallic electrodes covered with muslin or wool moistened with water, and connected with the conducting rods by a bundle of silver wires with gutta serena or caoutchouc envelopes. These tampons should be as broad as the nature of the surface to which they are to be applied will permit.

The general effects of the prolonged application of the current are increased heat of the body, subsequent sweating, and very often prolonged sleep, followed by complete repose of the whole body. Of local effects, those on the nerves of special sense are interesting. Most of these are, of course, well known; but the curious assertion is made by Remak, with regard to the nerves of taste, that the "galvanic taste" may be evoked in some patients by placing the electrode even on quite the lower part of the spine. Another fact which he states is that deaf persons are so sensitive to the constant current that the least application of the electrodes will produce sounds which may give a vain hope of recovery. The retina is more sensitive to the negative pole, and the gustatory nerve to the positive. The auditory nerve is more sensitive at the opening of the circuit than the closing (like a nerve of common sensation). As regards the action upon sensory and motor nerves, the down-running current acts more energetically on the nerves of sensation, and an up current on those of motion—the first at the point of exit, the latter at the point of entrance. But if you apply only one pole over the nerve, and the other on some different part of the body, both poles act alike on the sensory nerves and both alike on the motor; the direction of the current is downward in the former case and upward in the other.

Remak corrects the mistaken idea which he believes to exist in France that the *constant* current is the same thing as the continuous. The voltaic pile and the chains which are modifications of it can only be, even approximately, constant, when there is a good deal of resistance offered. But as the resistance of the skin is overcome by the current softening the skin, the current, though *continuous*, will not be *constant* in strength, but will become gradually weaker, and at last disappear.

* 'New York Med. Journal,' June, July, August, 1866.

The constant current can be applied in two ways—first, by keeping the electrodes fixed to the spot to which they are applied (*stabile Ströme*); and secondly, by moving them over the skin, touching it all the while (*labile Ströme*).

The negative electrode of the “*stabile Ströme*” produces an eruption of the skin rather like urticaria, which sometimes vesicates and produces a brown eschar, but without suppuration. In all inflammatory states of skin and tissues the positive pole, therefore, must be applied to the affected part, especially as it quiets exalted sensibility of nerves. There are important differences between the therapeutic actions of the current in repose and the current in motion. In general, the former (*stabile Ströme*) calms, while the moving current (*labile Ströme*) excites; yet in some paralyses the antiparalytic effect of the first is greater than that of the second. Interrupted currents are only useful in restoring muscles contracted from mere disuse; they have no curative effect on the paralysed, properly so called. The soothing influence of the constant current may be obtained when it is very feeble, and gives no pain, and this is the best way to give it. The influence is much more slowly produced than that of opium, morphia, or belladonna; but where these do not promptly bring relief it is much better to substitute the constant current. To soothe the pain of an inflamed part we apply the positive electrode (of sufficient size) on the inflamed part, and the other at a distance; 15 to 25 elements are employed. The electrodes must be pressed strongly on the skin, and in 5 to 20 minutes the pain will be much relieved. Where the slightest touch cannot be borne by the part actually affected, put the positive pole on the nerve leading to the part, *e.g.* on the brachial plexus in inflammation of the elbow-joint. Remak observes the singular fact that application of the current to certain points of the nervous centres (*e.g.* dorsal region of spine in locomotor ataxy) will sometimes cure pains in nerves, such as those of the legs, which seem to have no immediate connection with the point at which the current is applied. The constant current is only radically curative of pain when it reaches the disease at its source (*e.g.* the swelling of the nervous sheath in articular rheumatism, &c.).

The reanimating influence of the constant current is seen in a variety of circumstances. In central paralysis, and also in reflex paralysis, its effect is greater the nearer to the cerebral and cervical regions that it is applied. Pallor of the face from constricted cerebral vessels vanishes under it at once; and the colour of the blood is sometimes also improved by increase of the movements of respiration and circulation. Anæmia from defective assimilation is not benefited.

In common paralysis of motion the nervous centres and the nerve-trunks which are distributed to the palsied part have either not lost or have recovered their natural function. In such cases the negative electrode, acting on the motor nerves of the muscle, will restore its normal obedience to the will, and cause the fibres to swell up—a vasomotor effect, in all likelihood. In cases where the paralysis depends on or is kept up by an inflammation of the nerve, it is necessary to place the positive pole over the inflamed nerve, and the negative pole at a



distance (25 elements). Allow the current to obtain its maximum of constancy, and after two or three minutes the muscles will obey the mandate of the will perfectly. But it will then be necessary to apply the current directly to the muscle, when its previously flattened fibres will swell up, and movements will be effected with greater ease. No doubt, the swelling of the fibres is a vaso-motor effect. Sometimes a spasmodic contraction of some opposing muscle will prevent the palsied muscle responding freely to the stimulus of the current; in that case the positive electrode (battery of 20 or 30 elements) should be allowed to act for some minutes upon the contracted muscle, which will then relax.

In certain cases of facial hemiplegia, and other paralytic and spasmodic affections which depend on "some trouble in the circulation of the base of the brain," Remak finds that when the palsied muscles will not contract with the direct application of the constant current, they will do so after a period of preliminary applications of a descending current of 15 elements to the chain of the sympathetic in the neck.

The treatment of progressive muscular atrophy leads Remak to some surprising experiments. In this case it is quite useless to commence with direct application of the current to the muscle or its motor nerve. For example, in atrophy of the interosseous muscles of the hand the negative electrode is placed opposite the lower border of the sixth dorsal vertebra, and the positive in the mastoid fossa, beneath the auricle. The result is, not merely that the wasted muscles contract freely, but that their fibres swell up again, and a rapid improvement takes place. This kind of muscular contraction, which requires two points of excitement, is called by Remak "diplegic." He divides the spine into three zones (as the result of repeated tentative experiments); the first includes the region between the occiput and the 5th cervical vertebra, the second reaching from the 5th cervical to the 6th dorsal vertebra, and the third extending into the lumbar region and as far downwards as the lower extremities. In order to excite diplegic contractions, it is necessary to place one electrode within one of these zones and the other in a different zone. It is not necessary that both electrodes should be placed on the same side as the muscles which are to be affected; on the contrary, a cross current is often efficacious. The most singular fact is that the effect produced, so far from being more vigorous in proportion to the nearness of the poles to each other, is absolutely *nil* when the electrodes are placed close together in the *same* spinal zone. The only explanation which Remak can offer is that in these cases there is a simultaneous excitation of two sympathetic ganglia, one remote from the other, and that probably this excitation happens by means of communicating branches which enter into the posterior column of the grey matter of the cord, and anastomose with the ganglionic cells of the anterior cords, either of the same side or of the opposite side, intermediately by the commissure. In the instance cited by Remak, where the positive electrode was placed in the mastoid fossa, no doubt that pole excited the superior cervical ganglion of the sympathetic. In progressive muscular atrophy affecting the lower limbs the prognosis is, unfortunately, bad; but even here good

has been done by directing the constant current upon the inferior cervical ganglion.

In paraplegia, and especially in the affection known as "creeping paralysis," which begins with the lower extremities, and reaches the upper and even the cerebral nerves, the constant current has been very useful. In a case which was going on rapidly, the labile current (from 25 elements), applied upon the nucha and the two inferior ganglia of the sympathetic for about 12 minutes, produced surprising effects. In fact, *he was entirely restored to perfect sensory and motor power at two applications, and had no relapse whatever.*

In ataxic paraplegia the constant current is no less useful than in the more usual form. In hysterical paraplegia the poles applied over the lumbar region and the solar plexus have produced the happiest effects.

In contraction and rigidity of the muscles in hemiplegia the use of the constant current *at an early stage* seems to arrest the complaint. The current must be directed, not on the muscles, but on the great sympathetic and cerebral vessels of the opposite side.

Traumatic paraplegia affords another instance of what the catalytic power of the constant current can effect; for in a case of severe injury to the spine its application seemed (1) to help to restore the vertebral column to its normal position by relaxing certain spasmodic muscles and strengthening certain others which were improperly relaxed; (2) to relieve the nerve-trunks from pressure on them; and (3) to cause dilatation of the sanguine and lymphatic vessels, and thus bring about the re-establishment of circulation and absorption. The result was far more satisfactory than could possibly have been expected.

On the subject of the continuous voltaic current may be noted the details given by Dr. Hammond* of three cases of infantile paralysis, in each of which the current developed from a voltaic pile of 100 pieces effected a cure after powerful induction currents, as well as other local treatment, had entirely failed to produce any good effect. In each case there was much shrinking, if not positive atrophy, of the muscles. The materials of the voltaic pile were square pieces of copper gauze and perforated zinc, soldered together in pairs, each pair separated from the next by a piece of woollen cloth. The pile is excited by strong vinegar. The poles terminate in wet sponges. The effect is so powerful that a few seconds' contact of the poles with the skin will cause vesication. It would be highly dangerous to apply this apparatus to the face or any part of the district supplied by the 5th nerve, for the effect may be to communicate such a shock to the retina as to cause great disturbance, or even abolition of sight.

Dr. Eulenburg† discusses the treatment of the vulgarly called "rheumatic" palsy of the *portio dura*. He inclines to believe that this affection often depends upon pressure, from the patient's lying on one side of the face in sleeping (!). He bears witness to the fact which has been noticed by various writers, that there are many cases of facial palsy in which the induced current has not the least power to make the

* 'New York Journal of Med.,' December, 1865.

† 'Arch. f. Klin. Med.,' 1, p. 70, 1866.

muscles contract, while a very feeble constant current produces at opening and closing of the circuit most powerful contractions. These cases rapidly improve under this treatment, and at a certain date the constant current loses its force, and then the induction current will act upon the muscles. Eulenburg is at a loss to explain the difference in the action of the two kinds of current. Assuredly it is not (as Meyer thinks) a *reflex* influence by which the constant current provokes contraction; if this were the case the breaks of the induced current ought to act much more powerfully, which is the reverse of what happens. Nor can the alterative reviving action of the constant current account for the original difference as to muscular irritability, though it might explain in some degree the progress towards recovery of voluntary power and induction-irritability. As yet it can only be said that the motor nerves have specific susceptibilities to the stimulus of galvanism, Faradisation, and the will; and that under certain circumstances one or other of these may be removed, while one or both of the others remain intact. The prognosis of facial palsy is none the worse when there is nothing but galvanic irritability left; and assuredly this is no sign of intracranial mischief, as Meyer supposes. The subcutaneous injection of strychnia in facial palsy is rejected by Meyer, as superfluous in some cases and but doubtfully useful in the rest.

Professor Ziemssen,* of Erlangen, publishes a large number of researches on the difference in the excitability of paralysed nerves and muscles with Faradisation and with the constant current. The following are his conclusions:

"From the foregoing clinical and physiological observations on the anatomical and functional affections of paralysed nerves, especially in their relation to the two kinds of electric current, I believe that we may recognise provisionally the following grades of nerve-lesions:—First and slightest grade.—Motility limited or lost; excitability with interrupted and constant current normal; inconsiderable disturbances of nutrition in the nerves, rapid return of motility, and favorable influence of Faradisation. (Since, however, these phenomena are also seen in *severe* lesions in the first week, *i. e.* before the degeneration of the nerves is complete, no conclusion from them can safely be drawn till the second or third week.) Second grade.—Motility lost; irritability with Faradisation and constant current diminished; slight disturbance of nutrition; rapid return of motility and of normal electro-muscular contractility under the use of Faradisation. Third grade.—Motility lost; susceptibility both of nerves and muscles to the constant current retained. More severe disturbances of nutrition in the nerves; generally, if not always, a gradual departure of galvanic irritability, whilst (in the most favorable cases) the susceptibility to Faradisation sooner or later returns. Powerful influence of the constant current, negative result of the induced. Fourth grade.—The excitability of the nerves by the will and by both kinds of current is lost; on the other hand, the irritability of the muscles is retained.

* 'Berlin Klin. Wochensch.,' 43, 44, 45, 46, 1866.

Complete degeneration of the nerves quite into the muscles. The chances of amendment depend on the possibility of regeneration of the nerves. The constant current is indicated, with, perhaps, the alternate use of Faradisation. Fifth grade.—Both nerve and muscle are deprived of susceptibility to the stimulus both of the will and of each kind of electric current. Great nutritive mischief both in nerves and muscles. Prognosis probably very unfavorable; but as yet there is not sufficient material for the decision of this question.

"It must, of course, be understood that this division into grades is only provisional, for every one knows that there are a number of paradoxical phenomena which cannot be explained in this way. For instance, the case remains inexplicable of the different relation of the excitability by the will and by the electric current in the third grade of nutritive degeneration, especially the return of the normal voluntary power, while there is a complete lack of muscle and nerve susceptibility to the electric current; also the incomplete return of excitability by both currents in the course of the paralysis; and, finally, the want of agreement between the observations hitherto made on this point. It is possible that dissimilarities or differences in species in the alterations of the anatomical, physical, and chemical conditions of the nerves occur, which hitherto have escaped our recognition; it is also possible that, as Eulenburg assumes, in the motor nerve there reside separate energies for different stimuli. The distinct myopathic paralyses are not as yet adequately studied in their relations to the two kinds of current. Nor has any striking effect of either current upon these affections as yet been recognised, although latterly it has been regarded in many quarters as a fact that the constant current is better adapted than the induced current to their treatment. We must make our decision on this question dependent on further researches. The importance of the facts in the pathology and therapeutics of nervous paralysis is, however, so great, that it is highly desirable that a similar investigation of the myopathic paralyses shall be made. In general, the result may be expected, that as with palsied nerves so with palsied muscles, that kind of current to which the muscular fibres respond to by contraction is the best remedy for that particular case."

Dr. Althaus* relates an instance of successful treatment of general hysterical paralysis by the continuous current. His principle is to derive the current from a large number of Bunsen's or Daniell's cells, *feebly charged*. He does not think (with Remak) that the current acts directly upon the spinal cord; he believes that it affects the skin-nerves directly, and the cord only in a reflex manner. In this case a current (from 40 to 50 elements) was sent in an inverse direction from the nape to the sacrum, twice a week. The case, which was a severe one, with extensive affection both of motility and sensation, extinction of voice, &c. &c., was in 6 weeks practically well, and shortly afterwards the menses, which had been suppressed, reappeared. Althaus remarks that, not only in functional, but in many severe organic lesions of the cord, this treatment does good. He mentions an instance of

* 'Lancet,' Feb. 18, 1865.

complete paraplegia and wasting of the legs, after spinal meningitis, in which a great improvement, not only of power, but of nutrition of the limbs, was rapidly produced. He also says that it is beneficial in locomotor ataxy. In some other papers* he defines the difference between the effects of the continuous and the induced current in the following terms:—"The induced current only acts on the parts directly submitted to its influence unless a very high power be used; while the continuous current, by reflex action, also affects distant parts, and more especially the centres of the nervous system." He instances as proofs of the influence of the continuous current on the centres, the possibility (a) of causing the pupil to contract by directing a large current to the lower cervical and upper dorsal vertebra; (b) of inducing a glow of warmth in the feet by sending a current through the lumbar portion of the spine, also the production of a flash of light before the eyes when the current is applied to the face. In actual practice Althaus finds that the interrupted current is of no use in centric paralysis as long as the original disease remains, though it is of great service in local paralytic affections caused *e. g.* by pressure, rheumatism, lead, &c. The continuous current, on the other hand, is useful in centric paralyses, especially in those dependent on effusion in the spinal canal and softening of the cord, and in most instances of reflex paralysis where irritation is still present. In another paper Althaus gives numerous clinical illustrations of the practice above described.

In a paper on the pathology and treatment of hysteria Althaus† speaks of the highly beneficial effects of Faradisation on the symptoms of hysteria. Hyperæsthesia of the surface is generally cured by 2 or 3 applications of a wire brush, carrying a powerful current, to the skin, for a few minutes each time. The process gives pain, and should either be done under chloroform or after subcutaneous injection of morphia. In hysterical anæsthesia the same current must be applied, only it must be maintained for 10 or 15 minutes at a time; there is no pain here till the anæsthesia is dispelled. For anæsthesia of the nerves of special sense the continuous current is to be preferred. In anæsthesia of the mucous membrane of the bladder, rectum, and vagina, Faradisation is to be used. Faradisation can only be employed in hysteria after the acute symptoms have subsided. It is of no use in hysterical paraplegia. (Here, as noticed in a former paper, Althaus recommends the continuous current.) Faradisation is useful in globus, spasmodic cough, dysphagia, and aphonia.

Dr. Emil Fliess‡ has made a series of observations on the therapeutic influence of the constant galvanic current in cases of palpitation of the heart, whether from organic disease or mere excitement of the sympathetic (on von Bezold's view of the function of this nerve). A current was applied, either in the upward or downward direction, to the vagus, at the inner border of the sterno-mastoid muscle; the idea, of course, being that the vagus is an inhibitory nerve to the heart, and if excited might compensate the over-action of the sympathetic, which caused the

* Ibid., Aug. 12 and Sept. 2, 1865.

† 'Brit. Med. Journ.,' March 10, 1865.

‡ 'Berlin. Klin. Wochensch.,' xxvi, 1865.

palpitation. The results of Fliess's observations are as follows:—The application of a downward current to the one or both vagi strong enough to excite a moderate burning sensation, and continued for from 1 to 2 minutes, with moistened electrodes, only exceptionally caused an objectively perceptible slackening or weakening of the heart's beats immediately after the opening of the circuit (herein differing from the results obtained by v. Bezold), and never whilst the circuit remained closed. On the contrary, the patients, soon after the opening of the circuit, found ease and comparative improvement; and this good effect was more markedly produced after each successive application of the current. This was even noticed in some organic heart diseases. If the current were directed upwards the effects were less rapid, and feeble.

Dr. Tobold* writes a paper on the use of the constant current in the nervous affections of the larynx, in which he urges that this form of electricity is much less employed for these diseases than it should be.

Tobold speaks in very high terms of the constant current as a remedy for fixed neuralgic pain in the larynx. This neuralgia is purely local, and the constant current is the only certain remedy for it (hypodermic injection of morphia, for instance, producing only temporary benefit). It is useful, also, though not the only treatment, in spasmodic reflex cough from irritation of the nerves of the larynx. In ataxy of the glottis-muscles, and fatigue and weakness of the voice, it is often very useful. In all paralyses of the glottis which are of purely nervous origin the effects of the constant current are often very striking, and are always greater than those of the induced current. In these paralyses, also, whether of one or both vocal cords, in which movement is not actually lost, but vibration is defective and aphonia results, the constant current is equally useful. Dr. Tobold uses a battery composed of Minotti's cells, each charged with a solution of $\frac{1}{2}$ lb. of sulphate of copper; such a battery will continue to act perfectly well for a whole year.

Dr. Moritz Meyer,† on the other hand, though not wishing to deny the virtues of the constant current, says that for hysterical aphonia there is nothing effectual but the application of the induced current in the form of electric moxa, and he gives some striking instances of its action in such cases.

In addition to the papers above cited, the following on the application of electricity to nervous diseases may be mentioned:

Arndtsen, contributions to electro-therapy ('Norsk Mag.,' xii, 1865). Benedetti, treatment of spermatorrhœa by the induced current ('Journ. de Brux.,' Av., 1865). Barzano, on the constant current ('Gaz. Lomb.,' xiii, 1866). Braun and Remak, on the centripetal operation of the constant current ('Berlin. Klin. Woch.,' xii, 1865). Clemens, electricity in the diseases of the spinal cord ('Deutsche Klin.,' 11, 13, 1865). Frommhold, electro-therapy in nervous diseases (Pest, 1865). Poggioli, treatment of diseases by static electricity ('Bull. de l'Acad.,' xxxi). Ranke, the constant current as a sedative to spasm ('Zeitsch. f. Biol.,' iii, 1866, p. 397). Schivardi, electro-therapy ('Gaz. Lomb.,' v, 13). Rodolfi, electric treatment of hydrophobia and tetanus ('Gaz. Lomb.,' iv, 1865).

* 'Berl. Klin. Wochensch.,' 22, 1865.

† Ibid., 25, 1865.

The following are additional papers on nervous diseases :

Anstie, Lettsomian lectures on certain painful affections of the fifth nerve : demonstration of the probably *central position and organic nature* of the lesion in certain varieties of facial neuralgia ('Lancet,' 1866, June 16, July 14, Aug. 25). Bablin, on the diagnosis of diseases of spinal cord and sympathetic ('Gaz. Hebdom.,' 2 sér., ii, 4). Behier and Gintrac, iodide of potassium in treatment of diseases of nervous centres ('Bull. de Thérap.,' Feb. 15, 1865). Betz, F., treatment and pathology of sciatica ('Memorabil.,' x, 5). Bouchard, secondary softening of spinal cord ('Arch. Gén.,' Mars, Mai, 1865). Brown, concussion of spinal cord ('Med. Times and Gaz.,' March 3, 1865). Benedikt, progressive paralysis of cranial nerves ('Oest. Ztsch. f. prakt. Heilk.,' 1866). Bierbaum, J., corrosive sublimate in the treatment of supra-orbital neuralgia ('Deutsche Klin.,' vi, 1866). Bricheteau, intermittent infra-orbital neuralgia cured by hypodermic injection of quinine ('Bull. de Thérapie,' Feb. 15, 1866). Christian, J., pachymeningitis hæmorrhagica ('Gaz. des Hôp.,' xxi, 1865). Carré, M., relation between locomotor ataxy and general paralysis ('Gaz. des Hôp.,' lxxv, 1865). Chauveau, choreiform convulsions ('Arch. Gén.,' Mars, 1865). Cyon, E., chorea and its connection with articular rheumatism, pericarditis, and endocarditis ('Wien. Med. Ztsch.,' i, 1865). Carminiti, treatment of neuralgia by collodion and morphia ('Gaz. des Hôp.,' xxiv, 1865). Cornil and Martineau, tumour of cauda equina; secondary degeneration of posterior columns ('Gaz. Méd.,' 39, 1865). Carré, M., new researches on the anatomy and pathology of locomotor ataxy (Paris, 1865). Chataud, treatment of cerebral hæmorrhage ('Journ. de Bord.,' p. 153, Mars, 1865). Carré, M., post-mortem appearances in the sympathetic in locomotor ataxy ('Gaz. des Hôp.,' xlv, 1865). Caussin, case of acute ascending paralysis ('Gaz. des Hôp.,' xxxiii, 1866). Charpentier, treatment of paralysis with the hot sulphur waters of St. Armand (Paris, 1865). Chapman, J., cerebral anæmia, with fainting fits, cured by ice to spine ('Lancet,' i, 1865). Durrant, on central congestion, &c. ('Brit. Med. Journ.,' Jan. 21, 1865). Dupuy, P., traumatic neuralgias ('Gaz. des Hôp.,' xxxi, 1865). Dupuy, P., ataxie locomotrice (Bordeaux, 1865). Demarquay, paralysis of the forearm ('Gaz. des Hôp.,' xx, 1865). Dumenil, peripheral paralysis and neuritis ('Gaz. Hebdom.,' 4, 5, 6, 1866). Duffin, hydatid cyst in brain ('Brit. Med. Journ.,' Nov. 4, 1865). Erb, W., increase of corporeal heat in the death agony in central nervous diseases ('Arch. f. Klin. Med.,' ii, p. 165, 1865). Fontan, ophthalmoscopic appearances in acute brain softening ('Presse Méd.,' xviii, 1865). Fischer and Hirschfeld, on traumatic tetanus ('Berl. Klin. Woch.,' xi, 1865). Fayer, traumatic tetanus cured by opium smoking and internal use of chloroform and hemp. V. Franque, lead epilepsy ('Wien. Med. Presse,' ii, 1865). Fieber, on diplegic contractions ('Berl. Klin. Woch.,' 23, 1866). Gilchrist, tetanus in an insane person ('Brit. Med. Journ.,' April 1, 1865). Guner, B., epidemic paralysis ('Union Méd.,' ii, 1865). Gore, extensive tuberculosis of the cervical portion of the spinal cord ('Lancet,' ii, 1865). Gottstein, paralysis of the glottis ('Berl. Klin. Woch.,' lxi, 1865). L. Gemiündt, on chorea ('Memorab.,' vi, 1865). Grant, J. A., traumatic tetanus treated by acupuncture. Garrod, rapid muscular atrophy from lead ('Lancet,' i, p. 343, 1866). Gougenheim, aneurismal tumours of cerebral arteries (Paris, 1866). Gintrac, rheumatic meningitis ('Journ. de Bord.,' Janv. 1865). Herpin, appearances in the brain in rheumatism ('Journ. de Brux.,' p. 227, Mars, 1865). Herpin, atrophic palsy of shoulder-muscles cured by Faradisation ('Journ. de Brux.,' p. 232, 1865). Heschl, capillary aneurism in pons ('Schmidt's Jahrb.,' 126, p. 176, 1865). Hille, S. D., myelitis, with symptoms of severe chorea ('Med. Times and Gaz.,' Aug. 5, 1865). Heller, lipomatosis luxurians musculorum progressiva ('Schmidt,' 130, p. 286, 1866). Hunter, hypodermic injections in spinal neuralgias ('Brit. Med. Journ.,' Feb. 24, 1865). Jeffreys, thrombosis of the cerebral sinuses, with apoplexy of the thal. optic. ('Med. Times and Gaz.,' May 13, 1865). C. Hlandfield Jones, pathology of nervous diseases ('Med. Times and Gaz.,' Aug., Oct., Nov. 1865). Johnson, case of progressive locomotor ataxy ('Lancet,' i, 1866). Hlandfield Jones, paralytic contraction after fever ('Med. Times and Gaz.,' April 14, 1866). W. Koster, relations of brain tumour with changes in the optic nerve and retina ('Ann. d'Oc.,' Janv. et Fev. 1866). Lancereaux, on aphasia as a diagnostic sign in cerebral hæmorrhage and softening, &c. ('Gaz. des Hôp.,' lvii, 1865). Laycock, treatment of certain cases of chronic disease of nerve-centres ('Med. Times and Gaz.,' May, 1865). Leven, physiology and pathology of the cerebellum ('Gaz. Méd.,' 8—10, 1865). Lunier,

two cases of rupture of the heart in epileptics ('Gaz. des Hôp.,' 109, 1866). Liégard, on the application of electricity in intermittent neuralgia ('Gaz. des Hôp.,' 1, 1866). Laongue, cure of tetanus with sulphuric acid cautery ('Gaz. des Hôp.,' xxiv, 1866). Lebert, aneurisms of the cerebral arteries ('Berl. Klin. Woch.,' 20, 22, 1866). Menard, fatal meningeal hæmorrhage from drink ('Gaz. des Hôp.,' xxxiii, 1865). Michéa, epilepsy with "electric" chorea ('Gaz. des Hôp.,' xi, 1865). MacLaurin, exaggerated reflex action treated with Calabar bean ('Ed. Med. Journ.,' Oct. 1865). Moussaud, nervous delirium after acute diseases ('Gaz. des Hôp.,' 104, 1865). Nothnagel, case of grey degeneration of posterior columns ('Berlin. Klin. Woch.,' 1865). Oppolzer, tabes dorsalis ('Wien. Med. Woch.,' 26, 27, 28, 1866). Obernier, cases of brain tumour ('Virchow's Archiv,' 1, p. 155, 1866). J. L. Prevost, changes in muscles and cord in a case of infantile paralysis ('Gaz. Méd.,' 13, 1866). Pluck, concussion of spinal cord ('Med. Times and Gaz.,' March 10, 1866). Parodi, on epilepsy ('Ann. Univers.,' Lugl., 1865). Pearl, traumatic tetanus; recovery ('Med. Times and Gaz.,' April 29, 1865). Philippon, G. H., on weakness of the nerves in anæmia of the brain ('Brit. Med. Journ.,' May 2, 1865). Russell, cases of chorea ('Med. Times and Gaz.,' Jan. 28, 1865). Rengade and Regnaud, statistics as to the accidents produced by epilepsy ('Gaz. des Hôp.,' xviii, 1865). Ramskill, progressive locomotor ataxy ('Lancet,' i, May, 1865). Remak, on the participation of the cervical sympathetic in diphtheric paralysis ('Berl. Klin. Woch.,' xiii, 1865). Regnard, two cases of bronze-skin in general paralytics ('Gaz. Hebd.,' xii, 1865). Radcliffe, diagnosis and treatment of paralysis ('Lancet,' ii, Aug. 1865). Ramskill, unilateral sweating in an epileptic ('Med. Times and Gaz.,' April 7, 1865). Russell, unilateral congestion and sweating with epileptiform paroxysms ('Med. Times and Gaz.,' April 7, 1865). Robertson, apoplexy, with hypertrophy of heart, but no valvular or arterial disease ('Med. Times and Gaz.,' March 10, 1866). Rosenthal, central paralysis ('Wien. Med. Woch.,' vi, 1866). Rouse, pain in chorea ('Gaz. des Hôp.,' xxxvi, 1866).

Ladame, cancerous tumour of pons, with important remarks on diagnosis ('Arch. Gén.,' 1865, ii, pp. 129, 278). Perrenout, diagnosis of encephalic tumour ('Arch. Gén.,' 1865, i, p. 287). Duchek, cases of brain-tumour ('Wien. Med. Ztsch.,' 1865). Ladame, 'Diagnostik der Hirngeschwülste' (Würzburg, 1865). Russell, case of encephalic tumour and loss of sight ('Brit. Med. Journ.,' Feb. 25, 1865). Immermann, diagnosis of tumours in posterior fossa of skull ('Berl. Klin. Woch.,' 1865). Immermann, peculiar diagnostic vertigo in cases of posterior encephalic tumour ('Berlin Klin. Woch.,' 1865). Bitot, very large tubercular deposits in cerebellum; special consequences ('Arch. Gén.,' ii, 1865). Venturini, softening of cerebellum ('Schmidt's Jahrb.,' 1866). Cayley, abscess in cerebellum ('Path. Trans.,' 1866). Prevost, atrophy of olfactory nerve; its relation to the sense of smell ('Gaz. Méd.,' 37, 1866). Jackson, J. H., anosmia and defective sensations of smell ('Ophth. Hosp. Rep.,' vol. v, part iv). Jackson, J. H., affections of cranial nerves in locomotor ataxy ('Lancet,' Aug. 26, 1865). Frommüller, sen., case of colloid cancer of brain ('Prag. Vierteljahrssch.,' 1866, 4). J. W. Ogle, cysts in arachnoid cavity ('Journ. Mental Science,' Jan. 1865). S. Wilks, same subject (ibid., April, 1865). Pellegrino Levi, acute creeping palsy ('Arch. Gén.,' i, p. 129, 1865). Charcot and Bouchard, case of sclerosis of lateral columns of cord, with "hysterical" contraction of limbs ('Union Méd.,' 29 and 30, 1865). Meschede, osteoma of brain; epilepsy ('Arch. f. prakt. Heilk.,' 1866, 4). J. W. Ogle, Calabar bean in chorea ('Med. Times and Gaz.,' ii, p. 256, 1865). Buzzard (who first called attention to the subject in this country), on shock to the nervous centres from severe injuries ('Lancet,' Oct. 14, 1865). Erichsen, on railway injuries to the nervous system (Churchill, 1866). Lockhart Clarke, post-mortem of a case of railway injury to nervous centres ('Path. Trans.,' 1866). Burr, cases of injury to nervous centres from shock ('New York Med. Journ.,' Sept. 1865). Mason Warren, morphia (injected) as a cure for traumatic neuralgia ('Amer. Journ. Med. Sci.,' 1865). Lebert, on aneurisms of cerebral arteries (a series of papers in 'Berlin. Klin. Woch.,' 1866).

[Abstracts of all the papers named in the last paragraph of the above index, and of many others which are mentioned, had been prepared, but are crowded out. Special attention should also be called to the elaborate and valuable series of records by Dr. J. W. Ogle, in the 'Brit. and For. Rev.' for 1865-6, of cases of brain disease, which, though of great value for reference, cannot be dealt with in this 'Year-Book.']

C. DISEASES OF THE RESPIRATORY SYSTEM.

Spasmodic Asthma.

Dr. Von Bamberger is a strong opponent of the view which regards the asthmatic paroxysm as caused by spasm of the bronchial muscles, and believes that by far the most frequent and powerful agent in its production is spasm of the inspiratory muscles, especially the diaphragm. The following commentary, which he makes in a case which he has recorded, will explain his position with regard to this question:

* "I doubt not that among the causes of nervous asthma spasm of the diaphragm is the most frequent and the most influential, although it is not the only one. I especially believe this because, in reflecting on the cases of various patients, an important difference is obvious to me in the constituent elements and the whole *habitus* of the attacks. In one the spasm was more inspiratory, in another more expiratory; in one the activity of the *inspiratory* force was the greater, in another that of the *expiratory*. The complicated nature of these respiratory acts allows us to imagine many possibilities, of which the most part, however, have yet to be proved to exist. It appears to me, for instance, that in many cases the paroxysm is produced by a more chronic spasm of all, or of most, of the inspiratory muscles, as *e.g.* in hysteric asthma. (I do not refer to hysteric spasm of the glottis.) At least there always was, in cases of that kind which I have seen, a stormy, tumultuous respiration, in which all the auxiliary muscles of inspiration were called into play, while there was a perfectly unobstructed passage through the larynx. Expiration was easily performed, although (in natural proportion to the inspiration) it was stronger and more effective. But I will not assert that there are no other forms of asthma in hysteric subjects, nor that this same occurs in none but hysteric persons.

"A second possible cause consists in *paralysis of the diaphragm*. It is well known that Duchenne observed this occurrence in the human subject (especially in progressive muscular atrophy, and also in lead poisoning, hysteria, and inflammations of the abdominal organs), and also has been experimentally demonstrated (by section of the phrenics) by Lower, Senac, A. Cooper, and (more recently) by many others, as Valentin, Budge, Gerhardt, &c. &c. (See, especially, Gerhardt, 'Der Stand des Diaphragma,' Tübingen, 1860.) In many of these observations distinct asthmatic symptoms occurred; in some, on the contrary, these phenomena were not very marked. This was Budge's experience; he remarked, however, an increased action of the intercostal muscles. Besides, Gerhardt has justly remarked that the diaphragm receives nervous branches, not only from the phrenics, but also from the intercostals (7th to the 12th); and we must in any case agree with his conclusion that sudden palsy of the diaphragm must involve a very dangerous impediment to breathing. But that such forms, from their longer duration, ought to be separated from those dependent on spasm, which is naturally, as a rule, ephemeral, is *à priori* highly probable. The symp-

* 'Würzburg. Med. Zeitsch.,' vi, 1, 2, 1865.

toms produced by spasm of the diaphragm, especially the physical signs, are well described by Duchenne, and particularly by Gerhardt. The diagnosis, in actual cases, is little more difficult than that of spasm of the diaphragm.

"A further possibility, for the existence of which, however, we have, as yet, no proof, would consist in cramp of the *expiratory muscles alone*, especially the abdominal. And just as *cramp* of the diaphragm implies forced *activity* of these muscles, so would their *spasm* necessitate *increased action* of their antagonists, the inspiratory muscles.

"Finally, there still remains spasm of the bronchial muscles, which certainly has little probability in its favour, yet cannot be altogether passed over. What are the physical signs which might be expected in such circumstances? Since such a spasm would be an obstacle to both movements of respiration, yet would leave expiration freest, both inspiration and expiration must be performed laboriously, slowly, and with great expenditure of force, though this would be more especially true of expiration.

"We might also expect the diaphragm to be high up, the thorax to be contracted in all directions, and (probably) the intercostal spaces to be more strongly depressed. We should also anticipate a remarkable exaggeration of both inspiratory and expiratory breath sounds, especially of the former. According as the air, after overcoming the obstacle, penetrated to the terminal cells or failed to reach them, we should expect the breathing to be vesicular or confused. Moderate diminution of the percussion sound, especially as to its *fulness*, would be highly probable.

"If we turn now to what has been already said, the conclusion that nervous asthma may depend on various lesions of motor innervation will appear legitimate. Especially well established is the dependence of the form observed by Winterich and myself on tonic spasm of the diaphragm. Scarcely more doubtful is the existence of a form dependent on palsy of the same muscle; any other possible causes can only be established by further accurate observations. In a therapeutic point of view the constant current is most appropriate to the treatment of spasm of the diaphragm; Faradisation, on the contrary, to that of paralysis of the same."

Dr. Hyde Salter discusses the immediate excitants of the asthmatic paroxysm. They may be divided into those which are applied to the air-tubes (or which affect them primarily) and those which are applied to some remote part and affect the air-tubes secondarily. These last always reach the bronchial tubes by a nervous circuit, ganglionic or cerebro-spinal. [It will be observed that Dr. Salter holds the opinion that the paroxysm is actually due to spasm of the bronchial tubes.] The direct excitants are (*a*) things inhaled, (*b*) an inflamed and irritable bronchial mucous membrane, (*c*) the presence of blood which, without being actually morbid, is irritating; *e.g.* the blood after a meal. The irritants which act directly are either applied to the peripheries of the nervous system (*e.g.* stomach, rectum) or affect the brain itself; the latter may be organic or psychical in their nature. In the majority of cases the provocation of the attacks belong to more than one class,

thus, it is common to find that one and the same patient will, at different times, ascribe his attacks to "effluvium of hay, a late supper, the catamenial period," or to "mental excitement, nuts, fog," or "thundering weather, wine, the smell of a lucifer match," according as he possesses the nervous, the bronchial, or the peptic type of constitution. This seems to show that the asthmatic tendency consists rather in a general than a special irritability of the nervous system.

Salter discusses some excitants whose *modus operandi* is not very clear. *Cold*, he believes, acts in three ways:—1. As a local irritant, when cold air is inspired. 2. As a stimulant to the peripheral nerves of the skin, producing bronchial spasm in a reflex manner. 3. By provoking bronchial catarrh, in which case, after two or three days, the asthma comes on. *Heat and thunder* act by increasing the general irritability of the nervous system. *Over-exertion* acts—1. By overtaking the lungs, and generating a certain amount of respiratory arrears, and hence of pulmonary congestion, and, perhaps, by the rapid passage of cold air over the mucous membrane. 2. By producing nervous excitement and exhaustion. *Laughing* probably provokes asthma by producing a condition of extreme expiration; there is no doubt that this last is favorable to asthma. Salter believes that repeated forced expiration, by relieving the bronchial tube from the drag of the distending traction of expanded lung, tends to allow the spasm of the tube to assert itself uncontrolled. Also laughter tends to produce congestion of the lungs, and this may be another cause of asthmatic spasm. *Coughing and sneezing* probably act by throwing the air in the tubes into violent vibrations, in which form it becomes irritant.

Among the substances which, when inhaled, excite direct irritation of the tubes, Salter dwells on the large number of *animals* whose odour causes asthma in various individuals. Formerly he had only met with this effect from the smell of the rabbit and of the cat; but more recently he has met with it as caused by horses, wild beasts, guinea-pigs, cattle, dogs, and hares.

In another paper* Salter gives some statistics and observations on the influence of sex and age in determining the liability to asthma. He finds that there is a much greater liability on the part of males than of females, 102 of the former and only 51 of the latter being included in his assemblage of asthmatic cases. He thinks that this, as far as it goes, tells strongly in favour of a *local* cause for asthma, because men would be much more exposed to the influence of such than women. Again, he finds that during the period of life when the lungs are least likely to be organically affected, but the nervous system is most excitable, the female patients actually outnumber the males; whereas, in the period of life when organic disease of the lungs is most likely to exist, the males outnumber the females 5 to 1. Dr. Salter finds that asthma occurs at every age; and it is an interesting fact that a larger number of patients are first affected during the first decade of life than in any equal subsequent period. After childhood there is a sudden fall during adolescence, then a gradual rise up to the age of 40, from which point the number

* 'Lancet,' July 28, 1866.

of cases of asthma slowly but steadily diminishes through every succeeding decade of life.

Salter thinks that the great liability of the first decade of life is accounted for, because this is pre-eminently the period of zymotic and other diseases of childhood; these exhaust and irritate the system. In adolescence there is the minimum liability, because the system has recovered the depression inflicted on it by the diseases of infancy, and has not yet encountered the hardships of serious life. But from the completion of manhood to its prime the cares and struggles of life exhaust and irritate the system and render it liable. On the other hand, it is rare that first attacks of asthma occur in the later years of life; this is because the asthmatic tendency, if present at all, is almost sure to show itself at an earlier period of life. The general conclusion is, that the popular opinion, that asthma is a disease of old age, is not only not correct, but the very reverse of the truth.

Fetid Bronchorrhœa.

Dr. Laycock* calls attention to three kinds of lung diseases which are distinguished by fœtor of the breath, but in which there is no gangrene. 1. The first kind is judged to be a lung affection because there is no discoverable cause for the foul smell in the state either of nose, mouth, or throat, but there is no recognisable lung change. Dr. Laycock has seen this several times. 2. The second variety is called by the author "fetid bronchitis," and consists of a bronchorrhœa, or a broncho-pneumonia, with or without dilatation of bronchi. In this case the fœtor is produced by the products of excretion and exudation. Laycock insists that bronchial dilatation is not universally present, as Briquet, Dittrich, and others, have supposed. In some cases the cause of the symptoms is a broncho-pneumonia, limited to one lobe of the lung, usually in the left lung, and not infrequently attended by the signs of a circumscribed pleuritis. Symptoms of lung collapse occur at a later period, in many cases, as a result of repeated acute exacerbations; signs of the formation of a cavern then also present themselves. Hæmoptysis frequently accompanies the appearance of breath-fœtor. 3. The third variety of fetid lung disease depends upon the presence either of a vomica or of an abscess. Laennec spoke of such cases, where there is a collection of fetid secretion within a solidified portion of the lung, as "partial gangrene," but the general symptoms are quite distinct from those of true gangrene of the lung. It is impossible to suppose, for instance, that so much fœtor can be supposed to be produced by the small amount of gangrene which could alone be present, judging from physical signs. The particularly chronic course of the disease also forbids the supposition.

Laycock distinguishes three kinds of smell, the presence of either of which would make us term the breath "fetid." 1. A fecal smell. 2. A smell resembling that of ozæna. 3. The true gangrenous fœtor. Laycock does not consider that the decomposition which occasions the fœtor of bronchorrhœa is of the nature of putrescence. He is

* 'Edinb. Med. Journ.,' May, 1865.

inclined to think that there is an excess of butyric acid in the sputa, and believes that there is a rheumatic diathesis. Even in the cases of fetid breath where there is no recognisable lung affection, he is inclined to believe the rheumatic diathesis to be present, and thinks the phenomena are analogous to those of the stinking perspirations of the feet from which some persons suffer.

Dr. W. Moore records three cases in which copious fetid expectoration, closely simulating that of pulmonary gangrene, was produced in *pleurisy*, in neither of which was there any sign of perforation of the pleura. He inclines to believe that the fetid fluid was exosmosed through the pleural membrane into the lung, and thus the smell became perceptible.

Dr. Arthur Gamgee,* commenting on a case of fetid bronchorrhœa, in which butyric acid was found in the sputa, takes occasion to say that the presence of this substance in the expectoration is not at all peculiar to any form of bronchitis, but occurs in nearly all forms of chest disease. The acids which he believes occur in the sputa are the butyric, propionic, formic, acetic, and possibly the caprylic. Their presence is not surprising. The researches of Scherer, Gorup-Besanez, and Schottin, have proved the existence of most of them in the muscular juice, milk, &c., which most probably derive them preformed from the blood. Formed by the oxidation of various fatty matters, they are probably constantly present in small quantities in the blood, where they are partly consumed and partly separated by the various excreting organs, and, like other volatile substances, chiefly by the lungs. When the air-passages contain fluid it is only natural that they should be dissolved by the fluid, and thus find their way into the sputa. It will be a subject for future inquiry whether the quantity of volatile acids in the sputum is not greatest in those cases where the function of the lungs is so much impaired as to interfere materially with the oxidation of the blood. These considerations seem to Gamgee to prove that the occurrence of butyric acid in the sputum cannot at present be shown to have any semeiological value, and that its presence is in no way characteristic of fetid bronchitis. He thinks that there are at present no sufficient grounds for erecting cases of bronchitis with fœtor into a special morbid class.

Phthisis.

By far the most important observation on this disease that has been made of late years is that of Dr. Sidney Ringer,† as to the elevation of temperature which occurs in an early stage. The following are the propositions which express the conclusions which he establishes by ample evidence in his pamphlet:—1. There is probably a continued elevation of the temperature of the body in all cases in which a deposition of tubercle is taking place in any of its organs. 2. This elevation of the temperature is probably due to the general condition of the body (tuberculous), or to the

* 'Edin. Med. Journ.,' March, 1865.

† 'On the Temperature of the Body as a Means of Diagnosis in Phthisis and Tuberculosis.' Pamphlet, London, 1865.

deposition of tubercle in the organs. 3. This elevation is probably due to the first rather than the second of these processes. 4. The temperature may be taken as a measure of the amount of the tuberculosis and tuberculation, and any fluctuations in the temperature indicate corresponding fluctuations in the severity of the disease. 5. The temperature is a more accurate measure of the amount of the tuberculosis and tuberculation than either the physical signs or symptoms. 6. By means of the temperature we can diagnose tuberculosis and tuberculation long before the physical signs and symptoms are sufficient to justify such a diagnosis. (A very small amount of tubercular deposit has been known to raise the temperature to 103° or 104° Fahr.). 7. By means of the thermometer we can diagnose tuberculosis even when during the whole course of the disease there are no physical signs indicative of tubercular deposit in any organs of the body, and in which cases the symptoms (apart from the temperature) are inadequate to enable us to arrive at such a diagnosis. 8. It is probable that by the temperature we can conclude that the deposition of tubercle has ceased, and that any physical signs present are due to obsolescent tubercle and the chronic thickening of the lung-tissue between the tubercular deposit. 9. It is probable, though not yet certain, that by the temperature we can diagnose between diseases in which the symptoms and physical signs are either too scanty or too much alike to enable us to decide between them.

Dr. J. H. Dobell* has put forward a novel theory of the causation and proper treatment of tuberculosis and phthisis. He believes that tuberculosis is owing to a defect in the pancreatic secretion, whereby it becomes unable to emulsify and prepare for absorption the fatty matters in the food. The treatment to which this view of the matter leads him is as follows—In the first place, he gives pancreatic emulsions of solid fat or of oil to all those patients in whom there is reason to think that the pancreatic function is seriously impaired; he recommends such patients to inspire an atmosphere in which the proportion of oxygen has been diminished (so as to save the albuminoid tissues, as far as possible, from disintegration) and to maintain artificial warmth. But if the case be in an early stage the object must be to *restore* the function of the pancreas, and for this purpose the patient must be placed in a cold, dry, bracing climate, with highly oxygenated air; he must take exercise and a good diet, and live a cheerful life. Most cases, however, are not precisely fitted for the *sole* use of either of these plans of treatment, and a great deal of judgment and skill will be required in adjusting the precise scheme, by alternating the two kinds of procedure.

Dr. Samuel Fenwick† publishes some researches on the possibility of detecting lung-tissue in the sputa of phthisical patients; the observations were made in 100 suspected cases of the disease. The mode of examination which he employs is to liquefy the sputa by boiling them with solution of soda, and then placing them in a conical glass; any elastic tissue present then sinks to the bottom and can be picked

* 'Brit. Med. Journ.,' Jan. 20, Feb. 10, 1866.

† Ibid., July, 1866.

out for microscopic examination with ease. Extremely minute portions are readily detected in this way.

Of 23 cases believed to be in the first stage of phthisis lung-tissue was found in the sputa in 13. In 7 of the 23 there were no local, but only general symptoms of the disease; no lung-tissue was found in the expectoration of these. Of 16 cases in which there were stethoscopic indications of the presence of tubercle, lung-tissue was detected in 13. Of 24 cases where the physical signs indicated softening, lung-tissue was present in the sputa in every instance. Of 15 more doubtful examples of this stage, lung-tissue was detected in 7. In 35 cases there were physical signs of cavities; in all these lung-tissue was detected in the sputa. In two cases where bronchial dilatation had been diagnosed no lung-tissue was found. The microscope often proved the destruction of lung-tissue to be much greater than could have been supposed from the mere stethoscopic signs.

Dr. Pietra Santa* discusses the influence of the climate of the Pyrenees on phthisis. He concludes—1. That the air of the Pyrenees, at a height ranging from 700 to 800 mètres, at a barometric pressure of 700 millimètres, has the following peculiarities:—(a) It is naturally lighter than ordinary atmosphere; (b) it contains less oxygen for an equal volume; (c) it contains more aqueous vapour; (d) it contains a good deal of ozone, *i. e.* of oxygen in a peculiar electric condition. 2. Atmosphere thus constituted exerts a beneficial influence in chronic affections of the respiratory organs. 3. It therefore becomes a powerful auxiliary to the sulphuretted mineral waters scattered throughout the country.

On the subject of tuberculosis and phthisis in children, see the remarks in an important series of hospital clinical records, by Steiner and Neureutter, in the 'Prag. Vierteljahrsch.,' 1864-5 (abstracted in 'Schmidt's Jahrb.,' 129, pp. 190-2).

M. Rodolfo Rodolfi,† of Brescia, introduces a new mode of treatment for colliquative sweating, especially such as occurs in phthisis. He gives the patients every two hours a powder as follows:

R Sodæ Bicarb., gr. viij;
Sulph. Flor.,
Bismuth. Subnit., āā gr. j. M. ft. pulv.

In suitable cases this treatment produces great diminution of the sweating, which is observed at the end of four or five days. It is contra-indicated in all subjects who have a very delicate stomach, and who are affected with colliquative diarrhœa.

Dr. Druitt recommends, for the same purpose, bathing the parts which are the chief seat of the sweating with water as hot as it can possibly be borne. If this be thoroughly carried out the skin reddens brightly, and becomes dry, while the perspiration is completely stopped for several hours. This plan is only applicable to cases in which the perspiration is localised, and Druitt does not find it efficacious in instances where the sweating is preceded by regular febrile paroxysms.

* 'Gaz. Hebdom.,' Fév. 17, 1865.

† 'Bull. de Thérapeut.,' i, 1865, p. 381.

The cough and sleeplessness of phthisis were relieved by the use of narceine in the case of a child of 10 years, under M. Bouchut's care.* Various other opiate preparations had been vainly tried. About 1 centigramme (that is, '155 grain) of narceine was given, at first by daytime, but afterwards at night, as this was found to be more efficacious. It is noteworthy that no vomiting was produced; this symptom was almost constantly present in the adult females to whom M. Béhier has administered it. It will be interesting to observe whether future trials of the remedy on children establish their immunity from this disagreeable consequence.

Lung Diseases from inhalation of Foreign Matters.

On this subject the most important papers are those of Prof. F. A. Zenker ('Deutsch. Arch. f. Klin. Med.,' ii, p. 116, 1866), Dr. M. Rosenthal ('Wien. Ztsch.,' xxii, i, p. 97, 1866), Dr. Seltmann ('Deutsch. Arch. f. Klin. Med.,' ii, p. 300, 1866), Prof. Virchow ('Virchow's Arch.,' xxxv, p. 178, 1866), Leuthold ('Berlin. Klin. Woch.,' iii, 1866). [All the above are to be found, in abstract, in 'Schmidt's Jahrb.,' 132, pp. 160—176.] Warburton Begbie ('Glasgow Med. Journ.,' Sept. 1866). Compare also Koschlakoff on the origin of pigment in the lungs ('Virchow's Arch.,' xxxv, p. 186, 1866).

Pneumonia.

Dr. Schwarz† writes on the dangerous symptoms of croupal pneumonia and their treatment. 1. The pyrexia is not to be treated with bloodletting, which is probably directly injurious in several ways. Digitalis does not, probably, in reality cause the diminution of temperature which has been attributed to it. When this happens it is probably a part of the natural phenomena of the disease; and, on the other hand, the increase of blood-pressure which this drug causes is favorable to exudative processes. Tartar-emetic ought never to be used as an antifebrile agent. The application of *cold* is by far the best antifebrile remedy; it not only lessens the danger but also the pain of pneumonia; but in pregnant women and old persons sponging with water of a temperature of 15° to 20° Réaum. is a milder and better form of application. Where cold fails, large doses of quinine will diminish the temperature and the rapidity of the pulse; it is given in combination with camphor. 2. The symptoms of primary (local) and secondary (collateral) exudation are hard to distinguish in practice, though in theory they are markedly distinct, for they depend on different causes; and while the primary exudations are direct sources of danger, the collateral ones are a source of relief, and only become dangerous when in excess. The former demand direct remedies, the latter only require watching. The local exudations, by interfering with the circulation and the oxygenation of the blood, produce dyspnoea, cough, and bloody expectoration; they are best combated by full bleeding (although,

* 'Bull. de Thérapeut.,' i, p. 87, 1865.

† 'Bayer. ärzt. Intell. Bl.,' 1865; 'Schmidt's Jahrb.,' 126, p. 172, 1865.

however, there are many objections to this measure); cold is less appropriate. Digitalis, in doses which would be at all effective, probably does harm by repressing the collateral exudations. Antimony is an effective remedy for lowering the blood pressure. 3. Dangerous head symptoms, somnolence, sopor, &c., are most safely treated by venesection and cold. 4. Bronchial catarrh, also a sign of congestion, especially in old and in feeble subjects, demands stimulant treatment, especially by emetics, of which sulphate of copper is to be preferred both to ipecacuanha and antimony, as being less depressing in its after effects; it must be followed up by ammonia with anisum and ipecacuanha, with stimulating frictions to the skin, mustard plasters, and other internal stimulants, especially alcoholic drinks. The other expectorants are less appropriate than those above named.

Dr. Gairdner* makes some remarks on the treatment of acute diseases of the chest, *à propos* of a case of pneumonia. 1. He says he has acquired the conviction, by long experience, that bleeding, while still extremely useful in a very small class of cases, is not to be thought of as a part of routine treatment for inflammation. The cases in which it is of real and very high value are those in which there is great danger to life, but danger springing, not from the inflammation, but from other features of the case. Bloodletting, when beneficial, is *never depressing*, and it is a fatal error to give it with the intention of depressing. The only legitimate object of bloodletting is to give the patient the firm hold and right use of the blood which remains to him; and if he does not feel *stronger* 24 hours after venesection than he was before it, a mistake of practice has been made. 2. Dr. Gairdner equally objects to routine stimulation. He has a conviction that alcohol is not food at all, and that every drop of it which is given in excess of the usual quantity which may serve to assist digestion of real food is so much poison to the blood. Therefore, while he believes very decidedly in stimulants as having a great and valuable function to perform in the case of disease, he insists on the caution that there is great danger of going to excess in their use, and that this excess is not merely useless, but very dangerous. 3. With regard to antimony, Dr. Gairdner thinks that, although that drug is very valuable in proper cases, in all cases where the nutrition of the body has been ill-supported, where the patient is emaciated and haggard-looking from the effects of acute disease, where the bodily powers are depressed and the tissues imperfectly nourished, and the stomach has been for many days in a state not capable of assimilating nourishment—in all these cases the use of drugs, and especially of antimony, must be postponed in favour of the improvement of nutrition; and by the time the nutrition is put into a good state it will be found that there are no symptoms left which could be supposed to require antimony. 4. Dr. Gairdner does not, however, reject the use of drugs altogether, but he limits their use to certain cases. It depends on the particular features of each case whether it ought to be treated with or without medicines.

Dr. A. T. H. Waters† discusses the auscultatory signs which *precede*

* 'Lancet,' Jan. 13 and 20, 1866.

† Ibid., Feb. 11, 1865.

crepitation in pneumonia. He believes that Stokes was right in the opinion that an intense puerility of respiration in the affected parts precedes the occurrence of crepitation by some hours; and he relates two cases observed by himself which bear out this idea. Waters does not assert that the occurrence of localised puerile breathing at the commencement of respiration is universal, but he draws attention to the fact that the condition of the mucous membrane at this early period of the disease must be such as would be very likely to produce the sound in question. And, on the other hand, he has *not* heard what M. Grisolle declares to be the earliest sign of pneumonia, namely, a weakness of the breath-murmur.

Dr. J. Hughes Bennett* brings forward some remarkable statistics to show that pneumonia may be very successfully treated by an entirely "restorative" regimen. He says—1. The first great fact which the preceding figures serve to establish is, that a simple primary pneumonia, whether single or double, if treated by the restorative plan, is not a fatal disorder. Surely 103 cases, of which 26 were double, are sufficient to establish the proposition, especially when it is considered that they were diffused over 16 years, and occurred in all seasons. Amongst these, also, the whole of one lung was involved in no less than 15 cases, and the symptoms of many of them were exceedingly severe. Neither will any theory as to strength of constitution or change of type in disease explain the result, as several of the cases were those of healthy, vigorous young labourers, whilst others were those of weak and broken-down sempstresses. In any and every case the disease appears to go through its natural progress, so long as the body is not too much exhausted and the physician as early as possible supports it with nutrients and restoratives. The whole of Bennett's uncomplicated cases recovered. He does not place as much importance as most authors do on the extent of lung which is inflamed, and he believes that pneumonia of the *apices* is not, under a restorative treatment, more fatal than inflammation of any other portion of the lung. As local palliatives of pain, dyspnœa, &c., Bennett recommends warm fomentations and poultices, and allows that, in cases of great engorgement of the heart, small bleedings may be of service; but they are rarely needed, and are often useless or worse. But it should be remembered that in cases of double pneumonia there is often great dyspnœa about the sixth or seventh day, which will generally yield to warm poultices externally, and moderate doses of wine. Bennett's treatment consists of the use of strong beef-tea and other nutritive drinks, and from 4 to 8 ounces of port wine if the pulse become weak, and solid nutriment as soon as the stomach will bear it; the elimination of the exudation being further assisted by the use of salines (acetate of ammonia and small doses of tartar-emetic) and diuretics, though these are not *necessary* if the strength be maintained. All lowering measures, of every description, are to be avoided. Bennett is also averse to very large quantities of stimulants, which, he thinks, interfere with rather than aid the effects of the nutrient treatment.

* 'Lancet,' Feb. 25, 1865.

See also—

Thomas, the critical days in exudative pneumonia ('Arch. d. Heilk.,' 1865, p. 118). Thomas, action of digitalis in pneumonia ('Arch. d. Heilk.,' p. 329, 1865). Bäumler, on the occurrence of a tympanitic percussion sound in pneumonia ('Arch. f. Klin. Med.,' i, 2, p. 145, 1865). Salmen, pneumonia in children (an elaborate and valuable paper, 'Peterb. Med. Ztsch.,' xi, 3, p. 129, 1865). Theilhac, remittent pneumonia, with pain in splenic region, cured by quinine ('Gaz. des Hôp.,' 44, 1865). Hayden, T., tympanitic sound in pneumonia ('Dub. Journ.,' Feb. 1866). But especially see the comprehensive summary of recent writings on pneumonia by Niemeyer ('Schmidt's Jahrb.,' 132, pp. 317-35, 1866). From this paper we extract the following as having, probably, the greatest interest and novelty for English readers:

Thermometric Observations in Pneumonia.

"The collective result of all the observations so far published on the thermometry of pneumonia appears in the following sketch, by Kocher ('Behandl. d. croup. Pneum. mit Veratrum-präparaten,' Würzburg, 1866), of the normal cause of the fever in this disease. The commencement of pneumonia is announced with a rare constancy by *shivering*, with a simultaneous increase of *temperature*; the shivering is the surest starting-point for the calculation of the date of the disease. The initial temperature is so high that it is not commonly exceeded in the whole further course (40° — 39° Cent.). As the greatest febrile exacerbation occurs daily at noon, it appears that two thermometric examinations per day are not sufficient. When the fever has once reached a given height it commonly maintains itself at that level, with moderate remissions and exacerbations, till the commencement of defervescence. In the height of the disorder the temperature varies, on the average, between 36° and 40° Cent., and there is ordinarily one remission and one exacerbation in each 24 hours. The stage of high fever is commonly broken by one remission which is more marked than the usual morning remissions which precede and follow it; in some cases there may be, not one, but several such principal remissions. After the principal remission the temperature may follow three courses—either it reaches its old level at the next exacerbation, or may fall short of it, or may pass beyond it. The case is very rare in which the fever altogether vanishes for a time, and then once more undergoes recrudescence. The final defervescence is announced by a critical fall of the temperature, which usually occurs from 12 to 48 hours previously; in cases with *rapid crisis*, where the temperature becomes normal in as little as 24 hours, the fall is continuous; otherwise the daily alterations come in as a disturbing influence."

Especially worthy of notice, also, is the summary which Niemeyer gives of the results of recent experience of treatment by *Veratrum viride* and by digitalis respectively; we regret that it is impossible to find space for a translation of these passages in his report. Very important remarks on the usefulness of alcohol in the treatment of pneumonia are to be found in the 'Conférences de Clin. Médicale,' of M. Béhier, 8vo, 2 tom., Paris, 1865.

Inhalation of Atomised Fluids.

Dr. Morell Mackenzie* has brought forward an apparatus for the

* 'Lancet,' Feb. 25, 1865.

inhalation of atomised fluids, which is very simple and readily employed. The liquid is driven from a fine glass pipe on to a projection in a bell-shaped tube by the descent of a piston. The piston is drawn up without any exertion by a wheel and rack at its upper part, and is forced down by a circular spring which surrounds the cylinder. The apparatus is filled with liquid by a funnel in its top, and all the spray except that which is inhaled passes back into the apparatus. The advantages of the instrument are—1. Its simplicity, requiring only a few turns of a handle to set it in operation. 2. The extremely fine state of subdivision which it effects. 3. The uniform pressure exerted. 4. The fact that the waste liquid returns into the apparatus. 5. The ease with which it can be taken to pieces and cleaned. With this instrument Mackenzie applied various atomised fluids with the greatest benefit in bronchitis, asthma, and hæmoptysis. In bronchitis, especially, a very large number of cures were effected. Phthisis does not seem to be benefited, so far as regards the tubercular disease, but intercurrent bronchitis was removed and hæmoptysis was promptly checked in two cases of consumption.

Dr. Beigel* comes to the following conclusions as to the substances which are therapeutically useful when inhaled in the pulverised form:—1. In an inhalatory treatment of the respiratory organs nitrate of silver holds the first place; its dose is from 3 to 5 or 10 grains in an ounce of distilled water. It is especially serviceable in inflammatory conditions of the pharynx and larynx. 2. Much milder in its effects is nitrate of aluminium, which was first used for inhalation by Beigel; its dose is 3 grains in an ounce of distilled water. It is useful both in inflammatory and also in nervous affections of the larynx and the trachea. Other very useful drugs are—3. Tannin; 3 to 8 or 10 grains in an ounce of water. 4. Alum; 4 to 15 grains in the same. 5. Solution of sequichloride of iron; 1 minim to 5 or 10 minims in ditto. 6. Corrosive sublimate; 4 grains to 1 or 2 ounces. 7. Acetate of lead; $1\frac{1}{2}$ to 8 grains ditto. 8. Sulphate of zinc; $\frac{1}{2}$ grain to 5 grains ditto. 9. Common salt; 5 to 20 grains to an ounce; very useful in a variety of chest diseases. 10. Narcotics, *e.g.* tincture of opium; 1 to 10 minims in an ounce. 11. The salts of iodine, bromine, chlorine, &c. &c. 12. Lastly, pure vapour of very hot water is extremely serviceable in many cases, both of inflammation and paralysis of parts of the larynx.

Paracentesis Thoracis.

M. J. Guérin† provoked a long and not very interesting discussion at the Académie de Médecine by his eulogy of the subcutaneous method of operation in general, and of his own instrument for that purpose in particular. He employs—1. A flat, curved trocar, with a tap, the point of which is acute enough to penetrate easily through skin and muscles. 2. A piston-syringe capable of accurately *exhausting*. 3. An adjustment at the end of the syringe, consisting of a double tap (like that of an ordinary stomach-pump), for drawing liquid off and discharging it. The skin is then pinched into a fold, at the base of which the punc-

* 'Lancet,' July 29, 1865.

† 'Bull. de l'Acad.,' 1865.

ture is made, and after the withdrawal of the trocar is allowed at once to slip back, so that the internal orifice is covered and defended from the entrance of air. The tap on the trocar-tube guards against the entrance of air while the evacuation of the fluid is going on.

M. Guinier,* of Montpellier,* has submitted to the Académie de Médecine some much more interesting observations on paracentesis thoracis in children. The cases he has collected are 31 in number; the patients were of all ages up to 14; as many as 16, however, were in their 7th, 8th, or 9th year. His most important facts are as follows:—1. In a case, which appears unique, Guinier rapidly cured a large sero-purulent pleural effusion in a suckling child, 12 months old. 2. The 31 cases were derived from so many different authors that the truth must be discovered from a comparison of their results. 3. The operation has been done four times as often on boys as on girls. 4. It has been done six times as frequently on the left side as on the right. 5. There have been six times as many successes as failures. 6. The mortality is not in the ratio of the age. 7. The operation itself has *never seemed to do any harm*. 8. In every known case much immediate relief was obtained; recovery has been the rule, death the exception. 9. In the few fatal cases the operation has never appeared to accelerate, but rather to retard, death. 10. Comparing the numerous reported fatal cases of pleuritic effusion with the results of these 31 operated cases, one must conclude that paracentesis would have saved many of them. 11. In children the operation ought to be performed at an early stage, on account of the great tendency to purulent transformation of the fluid. 12. All the signs, both of pleuritic effusion and even of its purulent nature, are more distinct in the child than in the adult. 13. There is always distortion of the spine, &c., after cure by operation, but it soon spontaneously cures itself, and the quicker so the younger the child is. 14. The best method of operation is to make a single puncture with a trocar in a subcutaneous manner; this may be repeated if required. 15. Entrance of air may complicate matters, but does not endanger life. 16. Injections into the pleura had better be avoided if possible; but in the case of *fætor*, of course, they must be used. 17. The result of the inquiry is very favorable to paracentesis thoracis in children.

The question as to the advisability of paracentesis in pleural effusions generally is treated by Dr. Fraser.† This physician is strongly of opinion that the operation should be more generally employed than at present. In the first place, he discredits altogether the supposed evil effects of the mere admission of air to the pleural cavity. He states that the subcutaneous method is unnecessary, and that a direct puncture may be made at a convenient place through the skin and muscles right into the pleural cavity. He believes that pleural serous effusions are not often absorbed, not so frequently as pericardial serous effusions. In the few cases where mercurials have been supposed to bring about absorption he thinks the action of the drug is merely that of *restraining further effusion*. Medicines are proverbially unreliable, and thoracentesis, therefore, becomes the chief, if not the only, means for removing a serous

* 'Bull. de l'Acad. de Méd.,' xxx, p. 645; 'Bull. de Thérap.,' lxxviii, p. 483, 1865.

† 'London Hosp. Reports,' 1865.

effusion. He believes there is not the least ground for supposing that serum ever becomes pus in a closed cavity; and, on the other hand, it is notorious that pus is formed quite as readily in shut cavities as in those exposed to the air. Then, again, pus multiplies with such extraordinary rapidity that there is every motive for evacuating it as soon as possible. It is proved by the direct experiments of Nysten and Hewson that air injected into the pleural cavity does not the least harm to the serous membrane. Finally, there is good reason for supposing that air *always* exists within the pleura. The tendency of the whole question is, therefore, to an operation in all ordinary cases. If this be the case it should be performed early. No one, certainly, would think of puncturing the chest in the very acute stage of a pleurisy unless there were impending suffocation; but the passage from the acute stage to effusion is sharp and speedy, and the longer the operation is delayed the greater becomes the risk, and the less the chance of success. Nevertheless, the fact that adhesions have partially bound down the lung is not to be taken as a barrier to thoracentesis, for we can never predicate the extent to which the air-cells are still dilatable; and it is important that this operation should be performed before the lymph lining the pleura has time to assume a fibro-cellular structure, after which there will be little chance of absorption taking place. As to the conditions which are conventionally said to contra-indicate thoracentesis, Fraser says that—(1) Tuberculosis is only doubtfully a bar, for the continuance of fluid in the pleura is sure to set up tuberculous action in the compressed lung; yet the few statistics existing certainly seem to indicate that tuberculous subjects bear the operation badly. (2) Bronchitis is no bar, because, if not already present, it is sure to be set up from the increased strain put upon the lung. (3) Diseases of the heart will not be precipitated, and will be more probably benefited, by the operation. In cases where the fluid reforms, Dr. Fraser recommends the use of the drainage-tube so highly commended by Dr. Hamilton Roe and Dr. Fincham.

Dr. Chvostek,* in the course of a series of clinical papers on pleurisy, which are too long for us to analyse, makes some remarks on thoracentesis. In the case of mere serous effusion this is only a *palliative* measure, directed, usually, to the removal of danger to life caused by pressure on the heart, lungs, &c. It is therefore indicated—(1) if the effusion is so large that it not only compresses the lung on the affected side, but affects the lung of the healthy side, and the heart, and great vessels; (2) if the fluid is still increasing; and (3) if, correspondently, there are signs of insufficient respiration. Only so much fluid is to be withdrawn as the reaction of the compressed organs spontaneously expels; the entrance of air is thus prevented. Thoracentesis is to be performed in all cases of empyema, and the entrance of air into the pleura is not of much consequence.

M. Piorry proposes† a new (?) method of thoracentesis. He punctures the chest with a trocar and canula, to the latter of which an elastic catheter is attached, which dips at its free end into a basin of tepid water. The canula is guarded by a tap, and this is shut during inspira-

* 'Wien. Med. Wochenbl.,' 1865.

† 'Bull. de l'Académie de Méd.,' xxx, p. 534.

tion, and opened while the patient makes a forced expiration, when the liquid escapes from the pleural cavity with much freedom, and without the least entrance of air occurring. The point of the canula can be moved about successively to different parts of the chest, which careful percussion, not only before, but *during* the operation, may show to contain fluid or (in the case of pneumothorax) air.

Pneumothorax.

M. Demarquay* examines the nature and effects of the gaseous contents of the pleura in pneumothorax. He allows only of three possible sources for the gas:—(1) Atmospheric air entering through an external wound; (2) air from a torn lung; (3) gas from the decomposition of a purulent or other morbid exudation into the pleura. He decidedly rejects the notion of an “essential” pneumothorax. When once the gas is present the following changes take place:—Processes of absorption and exhalation occur, which produce a diminution of the oxygen and an increase of the carbonic acid, and (to a small extent) of the nitrogen. These changes, though superficially resembling those of respiration, are really very different. As regards the *chemical* influence of the gas upon the tissues and organs, Demarquay states that, if a communication with the lungs be present, an irritation of the pleura is kept up; while, on the contrary, if the external air be excluded, the gas is reabsorbed and the pleura remains unaffected. The irritant effect of external air is chiefly due to its oxygen. He thinks this is proved by the fact that, when pneumothorax has been caused by an external wound, if the further access of atmospheric air be prevented, no pleurisy follows. A gradually decomposing collection of gas in the pleura is likewise harmless, except where sulphuretted hydrogen or sulphide of ammonium is developed; this kind of decomposition, however, is very rare. The *mechanical* influence of the gas consists of compression of the lungs, displacement of the heart, &c. The latter is (according to Trousseau) the cause of the accelerated pulse. Demarquay has confirmed the above propositions experimentally on rabbits and dogs, on which he has artificially produced pneumothorax. With the rabbits he produced pleurisy and severe pneumonia by the injection of from 60 to 100 cubic centim. of air; he attributes this result, however, to their delicate constitution and the unavoidable wounding of the lung. In large and strong dogs the contrary was the case. Numerous and frequently repeated injections of from 100 to 150 cubic centim. of air into the pleura of these animals produced scarcely any effect. Chemical analysis here showed that in time the preparations of the CO₂ to the oxygen were reversed. On killing the animals he found not the least morbid change in the pleura or the lung, except that the latter was somewhat retracted. Demarquay hence concludes that the influence of air on a healthy pleura is harmless.

Prof. A. Vogel† relates a remarkable case of pneumothorax, which rapidly recovered after most dangerous symptoms. An unmarried

* ‘Gaz. Méd.,’ 32, 1865; ‘Schmidt’s Jahrb.,’ 128, p. 188, 1865.

† ‘Deutsch. Arch. f. klin. Med.,’ ii, p. 244, 1866.

woman, aged 29, who had borne ten children, and acted as a wet-nurse for a long time after each confinement, and had been perfectly well excepting that recently she had suffered from catarrh and an obstinate cough, in the midst of a sudden muscular exertion felt a sharp pain in the right side, and was seized with the most intense dyspnœa. When seen some hours later there were all the signs of the most complete pneumothorax of the right chest, with great displacement of the heart, lung, liver, &c., and severe collapse. Opium gave temporary ease, but on the next morning the anguish returned with waking, together with vomiting and choking sensations; yet no sign of pleuritic exudation could be detected. Morphia again gave relief to the pain and dyspnœa, and from this time all the symptoms steadily declined. In four days from the attack the patient had entirely recovered, and when seen a year later not a single trace of any mischief could be detected.

Pleurisy in Children.

Drs. Steiner and Neureutter* discuss the subject of pleurisy in children, basing their remarks on 27 observed cases. Pleurisy, in such degree that it can be diagnosed clinically, is rare in children, yet the pleura frequently partakes in various diseases of the lungs and of more remote organs; hence the apparent contradiction between clinical observers and morbid anatomists as to the frequency of the disease. Pleurisy with liquid effusion is the rarer; generally it is primary, and runs an acute course; the younger the child the less will be the amount of exudation. Pleurisy with proliferation of connective tissue is more common, and generally secondary and of protracted course; not infrequently, however, at any period of childhood, there occurs a mixed form, or sometimes even the two above-named varieties at once, one being developed in each pleural sac; finally, the older the child the more the *ensemble* of symptoms wears the appearance of pleurisy. Widening of the intercostal spaces on the affected side is only serviceable to diagnosis in the older children. More authentic is percussion, the weakened voice-thrill, and the increased resistance of the thorax is a most valuable sign, although not so constant as in adults; the dullness produced by pleurisy is more intense than that of pneumonia, except when both processes are present at once; finally, the weakness or entire absence of respiratory murmur, the weakened voice-sound, and the distant-sounding bronchial breathing, allow us to recognise a pleuritic effusion. On the other hand, pleuritic friction sounds and the displacement of neighbouring organs are rarely available for diagnosis. Of the functional symptoms, quick pulse, high temperature, dyspnœa, and cough, are variously prominent, according to the age of the child, the cause and form of the disease, and the nature of the complications. The site of the pain is, in children up to six or eight years old, almost constantly in the scrobiculus cordis; very young children only show pain in their countenance on being moved. Other nervous symptoms are only occasional in simple pleurisy, more frequent when there are pneumonic

* "Clinical Records of Children's Diseases," 'Prag. Vierteljahrsch.,' 1864-5; 'Schmidt's Jahrb.,' 129, p. 189.

complications. Termination by complete reabsorption of the fluid effusion is quite the rule; the process is often completed in simple pleurisy, even with considerable effusion, in a few days; in other cases the remaining products, in the form of layers of lymph, adhesions, &c. by their contraction produce curvature of the spine; or otherwise, if there be frequent relapses and a gradual increase, may under circumstances prove the most powerful cause of pulmonary tubercle. Such children seldom recover perfectly; they have frequent attacks of bronchial catarrh; their complexion is pale, with a tendency to yellowness, they have palpitation of the heart, and great fatigue after slight exertion. The termination of pleurisy in empyema is in children generally less dangerous than in adults. Prognosis is more favorable in primary than in secondary pleurisy, and in the latter the degree of danger is to be measured by the severity of the primary pleurisy; but the prognosis is fatal in secondary pleurisy in the course of pyæmia.

The treatment of pleurisy in children is not different in principle from that of the same disease in adults.

Other papers on diseases of the respiratory system are the following:

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D. DISEASES OF THE ORGANS OF CIRCULATION.

Cardiac Hypertrophy, &c.

Professor Traube* makes some interesting remarks on the successive phenomena of those diseases which produce hypertrophy of the left ventricle. When these cases run a typical course they pass through three stages; when compensatory hypertrophy of the left ventricle does not begin till late there are four stages:—1. The stage before hypertrophy commences. 2. The stage in which compensation (by means of hypertrophy) is established; this is longer than the former period. 3. The stage of failing energy of the left ventricle, and consequent congestion in the system of the pulmonary artery, which again causes hypertrophy of the right ventricle. 4. The stage in which, from failing energy of the right ventricle, there is blood-stain in the systemic veins. The third of these periods may last long, though it is always much shorter than the second. If it lasts long the hypertrophy of the right ventricle prevents the occurrence of secondary disturbance, except that there is bronchial catarrh and dyspnœa; but the third stage is generally only a short interval between the second and the fourth.

Dr. Hyde Salter† relates a case of extraordinary interest, in which there was enormous hypertrophy of the heart, without any discoverable disease from which it could be supposed to have originated. The fact that during life *no bruit* had been heard, coupled with the occurrence of a most violent and persistent epistaxis, induced Salter to expect that *smooth* mitral narrowing existed, and was the cause of a backward venous congestion. The cardiac symptoms all started from an attack of rheumatism, yet no valvular nor pericardial disease could be found after death, nor was there any discoverable mischief in either the lungs, the liver, or the kidneys. The causation of the hypertrophy is an insoluble problem. The patient was a man aged 35.

Direct Mitral Murmur.

Dr. Gairdner‡ brings forward a case as the text for some clinical remarks on the disease which it exemplified, and its auscultatory symptoms, viz. contraction of the mitral orifice and production of a pre-systolic or, as he names it, "auricular systolic" bruit. He considers that this bruit is pathognomic of mitral contraction if we except a few cases of tricuspid obstruction and some of disease of the pericardium, in which a somewhat similar murmur may be present.

Dr. Wilks,§ commenting on a case of the same disease, remarks that there could be no doubt in this instance that the blood was driven through a very narrow mitral orifice with considerable force, and it seemed wonderful that people should have doubted that such a state of

* 'Berl. Klin. Wochensch.,' i, 37.

† 'Brit. Med. Journ.,' July 28, 1866.

‡ 'Med. Times and Gaz.,' March 18, 1865.

§ 'Ibid.,' Feb. 25, 1865.

things was well-nigh certain to produce a bruit. But, in fact, search had been made for the bruit in the wrong place. It was Dr. Gairdner who first explained intelligibly that it was vain to expect the occurrence of a bruit in the second sound of the heart in mitral contraction; for, in fact, the auricle does not contract at this period, but after it, and immediately before the production of the first sound. In the case discussed by Wilks Dr. Gull had during life recognised the murmur as plainly presystolic, and had repeatedly declared the existence of mitral contraction during the patient's life.

Dr. H. G. Sutton* also publishes two cases which confirm Dr. Gairdner's opinion, and mentions that he has seen as many as five cases in which the presystolic murmur was heard during life; in all of them the mitral orifice was found greatly contracted. He speaks also of a class of cases in which there is a very short presystolic, followed by a long systolic, bruit; this is much the commonest form of mitral affection after acute rheumatism, and does not involve *great* diminution of the size of the mitral orifice.

Ulcerative Endocarditis.

Dr. Johann Schnitzler† remarks that the disease which bears this name, though familiar enough to us as regards its pathological anatomy, from the clinical point of view is as yet hardly more than a name; yet it really presents a very complete unity. Schnitzler gives the following picture of the disease. It occurs usually in middle life, most frequently as a sequel of articular or puerperal rheumatism, and probably sometimes of chronic valvular disease. Schnitzler is inclined to regard the primary affection as a constitutional disorder. *Pathological anatomy.*—As far as yet appears, endocarditis of this kind passes rapidly into destructive softening; the valves are perforated, broken up, in parts quite destroyed; the detritus is carried away, and produces capillary embolism. Occasionally, aneurism of the valves is produced, which may cause rupture and patency; this is but rarely repaired. There is a loud bruit, the place and time of which indicates the affected valve. *Prognosis.*—Cases of recovery have not hitherto been met with. *Diagnosis.*—At first this is often quite impossible, and at a later stage it is possible to confound the disease with typhus, puerperal fever, and even pyæmia and intermittent fever; careful examination of the heart is of the first importance, and even this may be fruitless, especially if the patient be not seen till a late stage, the more so as the symptoms of ulcerative endocarditis develop with uncommon rapidity. The character, intensity, and duration of the bruits are to be especially regarded. Besides this, ulcerative endocarditis is to be suspected if in a patient who has hitherto been either healthy, or only affected with rheumatism or other slight ailments, a sudden access of fever, palpitation, and dyspnoea occurs; the diagnosis will be rendered certain if symptoms of embolism have preceded. Moreover, the endocarditis extends to the tendinous structures, and sometimes reaches the muscular stratum. The

* 'Med. Times and Gaz.,' March 24, 1866.

† 'Wien. Med. Presse,' 15, 16, 18, 21, 1865; 'Schmidt's Jahrb.,' 1865.

valvular disease leads to dilatation and hypertrophy; the former is especially frequent. Consequences of the embolisms are visible in other organs. The blood was in one case strongly acid, and contained much fat, leucin, and tyrosin; in another the blood-corpuscles were irregular in shape. Ulcerative endocarditis most frequently attacks the mitral, and next to this the aortic, valves; it has only once, hitherto, been seen in the tricuspid. *Symptoms*.—In the first place there is palpitation, irregular action of the heart, and a sense of oppression; the conspicuous feature is often merely adynamic fever, and subsequently a typhoid condition. In other cases the illness begins with a shivering fit, followed by a remission, which is, however, incomplete; the shivering at first recurs periodically; jaundice usually soon comes on, and in some cases there is recognisable shrinking of the liver. Albuminuria is not rare. The course is generally rapid, the patient generally soon falls into collapse, and finally (in two or three weeks) dies somnolent. The physical signs are—strong, heaving, diffused, heart-impulse, exaggerated heart-sounds. *Treatment* is merely directed to symptoms; cold cataplasms, digitalis (but not if there be great prostration), narcotics, counter-irritation, and, if there be shivering, whether periodic or not, quinine. If there be low fever, by bark, mineral and vegetable acids, and finally musk; if there be pain in the spleen or liver, local bloodletting and cold cataplasms.

M. Héraud relates a case* in which the symptoms ran essentially the course depicted by Schnitzler; there were, however, no signs of embolism, nor was any embolus found after death, which occurred in fourteen days from the rigor which was the first symptom. The ulceration was in the aortic valve and the neighbouring tissues. There was sero-purulent effusion in the pericardium. A marked symptom was shivering, which occurred once at least each day.

MM. Duguet and Hayem† record a case in which there were a papular rash and petechiæ on the skin, with delirium, and a marked typhoid character of the general symptoms; secondary abscess in the ankle, and an ecthymatous pustule on the end of each toe; pericardial friction-sound very loud, and obscuring the heart-sounds. Post-mortem examination showed extensive ulcerations in the left ventricle and on the inner surface of the pericardium, and numerous secondary abscesses in the kidneys, the lungs, and the brain. The reporters of this case are inclined to think, from the occurrence here of typhoid symptoms *at the commencement*, that other observers have attributed too many of the phenomena in this disease to embolism and metastatic deposits.

The Graphic Method of examining the Organs of Circulation.

The first important result of recent labours in this field which has to be recorded is the complete establishment of the accurate and reliable working of M. Marey's ingenious sphygmograph. The defence of this instrument which was put forward by Wolff‡ in 1864 has been amply

* 'Gaz. des Hôp.,' 69, 70, 1865.

† 'Gaz. Méd.,' 41, 1865.

‡ 'Arch. der Heilkunde,' 1864.

confirmed by the much more extended observations of that author, as well as by those of numerous other observers; and there is now, we believe, no doubt felt about the matter. Even those who originally charged the instrument with the manufacture of secondary elevations in the pulse-curves, which were not due to arterial movements, but simply to the oscillations of the writing-lever, appear to be convinced of its accurate working.

On the other hand, the cardiograph of Marey is open to serious theoretical objections, which have been well stated by MM. Onimus and Viry* in their papers which we shall presently analyse, and it appears doubtful whether better clinical results will not be obtained by the application of Marey's sphygmograph over the heart itself (where it is desirable to directly explore that organ), but the question is not yet decided.

The first place must be given, in the history of sphygmographic progress, to the important treatise of Dr. O. Wolff.† The following is a sufficient analysis, for present purposes, of this work:

All the tracings of the pulse, as obtained by Marey's sphygmograph, agree in some properties relating to the ascent, the descent, and the vertex of the curve, and they represent, taken as a whole, an uninterrupted series of gradually changing curves, commencing with the normal pulse in health and terminating with the pulse which is affected by pathological conditions of the highest order. The curves were produced on blackened paper, great care having been always taken that the friction between the tracing point and the paper was reduced to a minimum; they were fixed afterwards by means of alcohol or oil of turpentine. More than 40,000 observations have furnished the material for this investigation.

I. *The pulse-curve of the arteria radialis.*—The sphygmograph was generally applied to the artery in the space between the eminentia carpi radialis and the perceptible spine of the radius. A difference between the tracings, obtained from the radial artery of the right and of the left arm, does not exist if both limbs are in equal healthy or pathological condition.

1. The curve of all *normal* radial pulses, without exception, is distinguished by its exquisitely tricrotic character, and is principally varied by the influence of frequency and intensity of the heart's contractions, both of which are dependent on age, state of nutrition, and the condition of the arterial tube.

The descending part of a pulse-curve is the most important one. It shows two negative waves or incisures, each of which is followed by a positive wave or ascent; the latter, as forming parts only of the whole curve, are called secondary waves, and the second incisure and second ascent bear respectively the name of great incisure and great ascent. A less essential ascent occurs sometimes at the bottom of the great incisure.

a. The normal radial pulse in *middle age*, as regards the intensity, is either large or middle or small. Allowing the sphygmograph to

* 'Robin's Journal de l'Anatomie et de la Physiologie,' Nos. 1 and 2, 1866.

† 'Charakteristik der Arterien Pulse,' Leipzig, W. Engelmann, 1865.

remain in its place sufficiently long, it will be found, by the gradual alterations of the curve, that the small pulse is nothing but the concealed large modification, which differs from the middle pulse inasmuch as the first secondary wave is met with a little nearer the apex. The wave exists in the middle pulse about in equal height with the middle of the ascending limb of the whole curve.

A faulty tracing of the large pulse is likely to result from the weakness of the spring, which in such cases ought to be strengthened in such a manner as not to retard the reproduction of the first secondary wave on the paper. This necessarily requires alteration of the instrument, and leads to a general consideration of the question whether Marey's sphygmograph does chronicle facts at variance with the events really taking place in the artery, especially whether the first secondary wave arises from an imperfect construction of the instrument, as contended by Duchek ('Med. Jahrb.,' 1862, 4, p. 55). Evidence is adduced that the tracings produced by Marey's sphygmograph are correct, and that any aberration from the truth must be looked for in the dimensions and not in the number of secondary ascensions. Adopting the irrefutable arguments of Vierordt in favour of this view ('Arch. d. Heilk.,' 1863, p. 516), the author strengthens his assertion that the tracing lever has no movement of its own by referring to tracings the regularity of which is disturbed by hiccough. In such a case, at whatever point of the curve the tracing lever may happen to be, it immediately follows the contraction of the artery subsequent to the hiccough, which is nothing else but a deep, rapid, and short inspiration, causing a negative wave. When the latter is coincident with an ascending movement of the lever, the predominance of the one wave or the other, or the annihilation of both, resulting in a horizontal line, is recorded on the paper with a degree of subtle exactitude which, having regard to the existing laws in physics, may be judged from a comparison with the immediately preceding or next following curves.

b. The normal radial pulse in *old age* possesses its own specific character, indicated, 1stly, by the great dimensions of the curve; 2ndly, by the closer proximity, not only of the first, but of all secondary ascensions to the apex of the curve; and 3rdly, by the extreme predominance of the first secondary wave, the basis of which exceeds in length two to three times that of the great ascension.

In near relation to the radial pulse of old-age stands that which is met with in people not far advanced in years and suffering from hypertrophy of the left ventricle, and, next, that which accompanies insufficiency of the aortic valve. In the last-mentioned case the pulse most closely resembles that of old age, and does not exhibit that specific pathognomonic character which is claimed for it by Marey. In a case of aneurism of the ascending aorta, and in another of aneurism of the descending aorta, the peculiarities of the pulse of old age could also be traced.

c. The normal radial pulse of children of 2 to 7 years of age is distinguished by a wave which ascends with great rapidity, and very gradually descends by small undulations. In girls the first secondary wave appears to be more marked than in boys.

Difference in sex does not constitute an exemption from the rules given above, the sometimes smaller dimensions of the curve of the female being neglected. As regards the occurrence of the normal curve of the radial pulse, the law holds good that it exists unconditionally in health, and that it may exist in disease.

2. The curve of the *pathological* radial pulse.—Different diseases cannot be recognised by pulses peculiar to them, but the pathological changes which the normal curve of the radial artery undergoes take place simultaneously with the changes occurring in fever, and are indicated by the rise or fall of temperature. The transformation of the normal pulse-curve is effected according to the following law:—The great incisure becomes enlarged at the expense of the adjacent secondary waves. The centre of all pathological pulses is the dicrotic form, distinguished by its great incisure extending downwards to the base of the curve, by its smaller first secondary wave, and by its increased frequency, which causes the great ascent to appear more shifted towards the end of the curve. This type is preceded in fever by the hypodicrotic pulse, the great incisure of which does not reach yet to the base of the curve, while the great ascent is only a little retarded. In the hyperdicrotic pulse the lowest point of the great incisure is rounded off and lies below the base of the curve, the first secondary wave is reduced in its size to a minimum. The great ascent, being assailed itself, appears by the again increased frequency even more at the end of the curve. Finally, in the highest paroxysm of fever the great incisure and great ascent annihilate each other, and with the disappearance of the dicrotic form the monocrotic pulse is established. The changes of temperature influence the pulse-curve in acute disease in a different manner than in chronic disease.

a. The radial pulse-curve in *acute febrile disease of middle age*.—In a febrile accession and on a rise of temperature from the maximum of the normal heat of the body to about 103.5° Fahr. the pulse assumes the hypodicrotic type, followed by the dicrotic form about between 103.5° — 105° Fahr. At this stage of the fever the first secondary wave has lost much of its amplitude and energy, while the great ascent, having gained in strength, makes the dicrotism easily perceptible to the finger. Besides in typhus, it has been observed in cases of pneumonia, acute exanthems and rheumatism, pericarditis, &c. The origin of exceptions to the rule may be traced to a disturbed innervation of the system of circulation, or, in other words, to the presence of symptoms dependent upon irritation of the central and vegetative system of nerves, or to more or less perfect paralysis. As cases of this kind are mentioned fracture of a lumbar vertebra, the period immediately following violent shivering in intermittent fever and pyæmia, asphyxia by drowning, narcosis by chloroform, chronic cholera pictonum combined with fever. The pulse of such patients, as also of paralysed people, whether their intellect be impaired or not, preserves its tricrotic character for a much longer period during illness, but at the same time the common type of the different pulses is more or less modified; variations in this sense are shown by the apparently normal and apparently hypodicrotic pulse-curve.

If the fever has made progress so far as to be accompanied by a

temperature above 105° Fahr., the pulse becomes hyperdicrotic. Besides its occurrence in the corresponding stages of typhus, pneumonia, pleuritis, pericarditis, it is constantly to be found after violent shiverings in intermittent, in leucæmia, pyæmia resulting from fractures, and puerperal fever. If quinine has been given, the great incisure is not rounded off, but more pointed at its lowest point, and the retrograde metamorphosis to the dicrotic pulse at the end of the paroxysm tends to prove that the great ascent has never been conquered completely by the great incisure.

The highly accelerated fever pulse finally exhibits at a temperature between $106-108^{\circ}$ Fahr. the more or less perfect monocrotic type; it often appears only to usher in death.

b. The radial pulse-curve in chronic febrile disease of the middle age.—The greater part of the observations were made on patients suffering from chronic tuberculosis of the lungs, and the conclusion arrived at is that in chronic disease each phase of the pulse-curve presented in acute disease appears already at a temperature at least 2° lower. The normal radial pulse-curve is found at or below 97° Fahr.; this temperature will be the lower the longer duration of the fever is and the more the organism is undermined. The same law is applicable to persons recovering from an acute febrile disease, so that, for instance, during the first period of convalescence the pulse is never normal, but hypodicrotic.

c. The radial pulse-curve in febrile disease of old people. (This period commences in the male with $50-52$, in the female with 52 years.)—Following the rules given above, the result is modified by the character of the pulse peculiar to old age. The first secondary wave, being very prominent, may lose a good deal of its size, while the great incisure increases; yet the tricrotic character of the curve will remain better and for a longer time preserved. The pulse-curve of persons with insufficiency of the aortic valve, when affected with febrile disease, is attacked in an analogous manner. Exemptions to the rule concern febrile diseases complicated with paralysis, where also, like in middle age, the tricrotism of the curve is less easily destroyed.

As to the mode of production of the pathological phases of the pulse, of which the distinctly dicrotic form is considered by him to be the central type, Wolff asks the question, Is it diminished blood-pressure alone which causes the pathological changes of the pulse, and heightened pressure which restores it to the normal form? Assuredly not. The pulse of the feverless subject of marasmus is undeniably feeble, and the pressure of the few pounds of blood in his attenuated arteries is low enough to produce dicrotism, if dicrotism were dependent on such a cause. Wolff calls attention to the fact that the act of coughing produces diminution of arterial pressure and increased force and speed of the heart's action, while the traces of the pulse show that it is larger and more frequent. He compares this to the state of things in fever; there the heart's action is heightened on the one side, and the tone of the vessels diminished on the other; the pulse is excessively accelerated. In digestion, also, we have dilatation of the vessels of the stomach, heightened force and rapidity of the heart-beat, and the pulse is large, rapid, and subdicrotic. A similar state of things prevails in

severe fatigue from bodily exertion, *e. g.* after parturition or an epileptic fit. On the other hand, in recent paralytic cases, where there is no febrile excitement, the line of descent is almost free from traces of secondary waves; and this is a state of things which must correspond to defective innervation both of heart and arteries, involving diminished heart force and diminished arterial tension. At the one extreme of the scale lies the paralytic pulse, at the other the fully developed dicrotous pulse; and the normal pulse which lies midway between these two is the strictly trierotous form, which is a result of the combination of medium heart-force and medium arterial pressure.

We are unable, from lack of space, to analyse the interesting results obtained by Wolff from the comparison of the radial pulse with those of other arteries, especially of the dorsalis pedis; nor can we do more than allude to his important researches on the relations of the daily changes in the pulse form in fever with the changes of temperature, and must finally recommend the whole volume to the careful study of all who intend to use the sphygmograph.

Wolff confines himself almost absolutely to the business of carefully and impartially recording the various pulse changes, and rarely touches questions of theory. On the other hand, the able papers of MM. E. Onimus and Ch. Viry* are chiefly theoretical, and have to do with the mode of production of the several elements of the pulse-tracing, especially with the origin of the secondary waves.

It is necessary, before analysing the work of Onimus and Viry, to say a few words on the position which they hold with regard to the general theory of arterial pulsation. They are disciples of E. H. Weber, and consider that the whole phenomena of pulsation are wave-phenomena. They thus come into immediate collision with M. Marey upon an important point. Marey throughout his classical work† uses language which leaves no doubt that he considers pulsation to be caused by the actual passage into the vessels of a mass of blood propelled by the heart, which increases arterial tension. Onimus and Viry, on the contrary, consider that the rapidity of the blood-current and the frequency of pulsation are entirely independent of each other; they support this, on the one hand, by the observation of Chauveau—that compression of an artery sufficient to arrest the blood-current does not arrest pulsation—and, on the other, by the remark that in many pathological conditions with a very rapid pulse there is a very slow interchange of nutritive matters, and a languid movement of the mass of blood. They observe that the circulation is a system in motion under the action of a chief propelling organ, opposed by varying resistance; the equilibrium of the forces is preserved by an apparatus of regulation (the nervous system). They maintain that the changing conditions of this third element make it necessary to substitute for Marey's law, "that the number of contractions of the heart varies inversely to the arterial tension," the formula, "the number of contractions of the heart varies directly with the initial force," this initial heart-force being liable to be weakened by conditions such as fasting,

* 'Journal de l'Anat. et de la Phys.,' Nos. 1 and 2, 1866.

† 'Physiologie Médicale de la Circulation du Sang,' Paris, 1863.

anæmia, &c., and strengthened by everything which augments combustion-processes in the blood; weakened again by nervous influences which contract the capillaries and make them resistant, and by deficient innervation of the heart itself, and strengthened by nervous paralysis of the resisting capillaries and by nervous excitement of the heart.

Regarding arterial pulsation, then, as a series of waves governed by the conditions above named, Onimus and Viry investigate the production of the minor elevations which appear in the line of descent of the principal pulse-curves. They come to the conclusion that the dicrotic wave is centripetal in direction, being a reflux from the periphery, caused by the resistance there established by (a) impaction of blood-globules in capillary vessels, (b) narrowing calibre of tubes, (c) friction against bifurcations of tubes. They point out that Marey's definition of dicrotism as an oscillation of blood in the vessels is the fruit of his conception of the pulse as a blood-current. Against the view of Naumann,* that the secondary waves move centrifugally (being reflected from the aortic valves), they oppose, as their chief argument, the statement that dicrotic phenomena are always more strongly marked in proportion as the artery examined is nearer the periphery. [This is in direct opposition to the statements, not only of Naumann himself, but of numerous other observers, and is especially contradicted by the researches of Dr. Burdon-Sanderson on the carotid pulse.] This greater development of dicrotism at the periphery is in accordance with what theory would predict as the result of three influences which must tend to diminish a reflex (centripetal) wave, viz.—1. The virtual diminution of elasticity by the increased arterial tension in the greater vessels. 2. Actual diminution in elasticity of the arterial walls in the larger vessels. 3. The loss of communicated force (by friction, &c.). It is also said to be in accordance with a law which Onimus and Viry enounce (chiefly on the authority of Czermak†), viz. that the rapidity of transmission of the direct or primitive pulse-wave increases as it approaches the periphery, while its size diminishes, owing to the numerous divisions into which it is broken up by the branching of the vessels; so that the reflection of this wave must be so weak as to be rapidly diminished in its progress towards the heart. The prominence of dicrotism in peripheral pulses would also accord with the theoretical cause which should favour such a reflex wave. The obstacle with which the direct pulse-wave must meet in order for it to be reflected is to be found in its most decided form in the capillaries, which the blood-globules traverse slowly and with much pressure, owing to the small size of these tubes. Onimus and Viry adopt the conclusions of Koschlakoff‡ in the following form:—Dicrotism occurs—1, when, other things being equal, the heart-force is increased; 2, when, other things being equal, the arterial tension is diminished. In both these cases the line of ascent is sudden and vertical. Dicrotism ceases—1, when, other things being equal, the heart-force is diminished; 2, when, other things being equal, the general tension is increased. In both these

* 'Arch. f. Heilkunde,' 1864.

† Czermak, 'Mittheilungen aus dem phys. priv. Laboratorium,' 1. lft., Wien, 1864.

‡ Vide Syd. Soc. 'Year-Book,' 1864 'Virchow's Arch.,' xxx, 1864.

cases the line of ascent is more sloping than when there is dicrotism. A sudden ascent is a sign of dicrotism, a sloping ascent is a sign of its absence. Onimus and Viry also concur with Koschlakoff's dictum, that the presence of dicrotism is masked, and the trace appears monocrotous, when the pulse reaches a certain frequency. They add that, when the secondary waves are small and very numerous, they probably are all of them centripetal, being reflected from various points of the periphery; but that when they are few in number, far apart, and large in size, they are probably centrifugal, being reflected from the aortic valves (as supposed by Naumann). [It is difficult to reconcile this last opinion with their previous arguments, which dwell so strongly on the supposed predominance of peripheral dicrotism.]

M. Marey describes* experiments made with his cardiograph. This is an instrument in which the traces of the ventricle are communicated to a writing-lever (similar to that of the sphygmograph) by the intervention of an apparatus in which the immediate impulse of the heart is received upon a sort of pad formed by a layer of water enclosed between two india-rubber membranes; this pad closes the mouth of a bell-shaped brass chamber, from which an india-rubber tube leads; this tube terminates in a flattened hollow disc of india rubber, on the upper surface of which is placed the knife edge which raises the writing-lever. The water pad ensures close application to the chest-wall opposite the ventricle; the column of air in the tube communicates the pulsations to the writing-lever. The experiments detailed in M. Marey's paper are rather physiological than medical in their scope, as they are concerned with the relations between the movements of inspiration and expiration.

Onimus and Viry, in the paper already cited, deny that the traces attained with Marey's cardiograph are equal in trustworthiness to those obtained by the sphygmograph. In the latter the pulsations are received by a solid metallic spring, and conveyed by altogether solid media to the writing-lever. In the cardiograph, on the contrary, the column of air which forms the communication is itself liable to be thrown into oscillations, which need by no means follow accurately those of the ventricle. And besides this, there is an overlooked source of fallacy in slight movements of the intercostal muscles, which may at any moment introduce factitious elements into the tracing.

Dr. Balthazar Foster† repeats and enforces the views of M. Marey in a series of papers in which he explains the leading doctrines of the French physiologist, and gives a number of illustrations of the traces obtained by himself in cases of aortic obstruction, aneurism, mitral regurgitation, and senile disease.

Foster‡ also publishes some papers on the application, not only of the sphygmograph, but of the cardiograph of Marey, to the examination of the heart and great vessels. The first case which he relates is one of aortic obstruction and regurgitation, with dilatation of the aorta, and

* 'Journal de l'Anat. et de la Physiol.,' ii, 1865.

† 'Brit. Med. Journal,' 1866, i, pp. 275, 330. Also in pamphlet form, Churchill 1866.

‡ 'Med. Times and Gazette,' ii, 1866, pp. 337, 606.

the traces given by the sphygmograph are such as Marey has described as appropriate to these conditions. In treating of the cardiographic traces obtained in this case Foster points out that at the commencement of that portion of the tracing which corresponds to the period of filling of the ventricle there is one sudden ascent of the lever which differs markedly from the form of this part of the trace obtained from a normal heart. He considers this indicates the arrival of a considerable quantity of blood in the ventricle, not only from the auricle, but by regurgitation, from the aorta. He also observes that the hypertrophy of the ventricle is indicated by the altitude of the line which marks the ventricular contraction, and the almost horizontal direction of the vibrations immediately succeeding the first partial fall of the lever, showing the increased duration of the systole. The line of descent after systole had a vertical character in the case commented on; this showed a sudden diminution in the intra-ventricular pressure, which proved that the ventricle had been efficiently emptied of blood.

In another case, which Foster relates, there was mitral regurgitation, hypertrophy, and senile degeneration of the thoracic aorta. As regards the sphygmographic indications, it is important to note that the want of elasticity produced in the thoracic aorta by the degenerative disease did not make itself visible by the appearance, in the radial pulse, of the square-headed trace which is indicative of arterial rigidity. Foster inclines to believe that, where only the great arteries of the chest are affected with senile degeneration, the graphic form of the pulse will give no indication of the normal condition. [My experience is different; I have several times diagnosed such disease from the character of the radial pulse.—F. E. A.]

Dr. Burdon-Sanderson and Dr. Anstie commence a series of papers on the indications of the sphygmograph; the papers falling within our period are two by Dr. Burdon-Sanderson—on the theory of the pulse, and on the varieties of the pulse in disease*. Dr. Sanderson commences by remarking on the absolute necessity of a close and constant reference to the physiological phenomena of the circulation by those who would draw reliable inferences from sphygmographic traces. He remarks that the exposition of the "wave theory" by E. H. Weber, which affirmed that the pulse "*non est materia progrediens, sed forma materiei progrediens*," was the first step to an understanding of the mechanism of pulsation. With the application of graphic instruments, however, the subject assumes a new aspect, and requires fresh investigation. For this purpose there is nothing so useful as a comparative examination of the traces given by the pulse at different distances from the heart; and he proposes to compare the radial trace with that obtained from the carotid artery, since in man, of course, the aorta cannot be explored. The exploration of the carotid reveals, first of all, the fact that the pulse-curve is divided into two parts. One of these coincides with the period during which the heart is in communication with the aorta, the other with the period during which the sigmoid valves remain closed. The commencement of the first part (systolic period)

* 'Lancet,' Nov. 10 and Dec. 22, 1866.

is always marked by a sudden upward jerk of the lever, usually indicated by a nearly vertical line; the close by a second, but more inconsiderable, jerk, which is always preceded by a sudden depression. During the first part of the systolic period the artery is distended with blood, but towards the end the distension suddenly ceases. The contraction of the ventricle having ceased, the blood flows back for a moment towards the heart, but is immediately arrested by the closure of the aortic valves. This is at once followed by a second rise of aortic pressure, and the lever is tilted up, as already described. After this rise the lever falls steadily, making an oblique line of descent to the point where a new systole commences. Of the less constant characters of the carotid tracing some are directly dependent on the mode in which the ventricle contracts, others on peculiarities in the closure of the aortic valves. Under certain conditions the blood in the ventricle is thrown into rapid vibration during the act of contraction; this effect, being communicated to the carotid, causes a series of notches to appear in the ascending limb of the pulse-curve; when these are very marked, the artery communicates a sensible thrill to the finger. As to the line of descent, there may be every variety of depth of the notch before the rise following the closure of the aortic valves; sometimes it is very much marked, sometimes it appears as a mere change of direction rather than a notch. These differences depend on the degree of rapidity of closure of the aortic valves, complete and rapid closure causing the deep notch, and *vice versâ*. It is apparent from these considerations that pulsation in the great vessels is produced by simultaneous increase of tension and acceleration of movement. In the more distant arteries the two effects are no longer coincident. Both are transmitted, but their propagation is influenced in an appropriate manner by the physical conditions with which they meet, and thus the pulse, in its transmission from the heart to the periphery, becomes split into its two elements of expansion and acceleration. The first of these (and the only one hitherto recognised) is gradual in its progress, and is represented by the whole "systolic" part of the graphic pulse-curve. The second is quasi-instantaneous in propagation; it is due to a sudden impulse, or percussion, communicated to the blood in the aorta at the moment when contraction of the ventricle commences, and is, in fact, an oscillatory movement of the blood itself in the axis of the vessels, inverse in intensity to the arterial resistance; all this may be readily imitated in elastic tubes containing liquid to which a shock is communicated. It is represented in the carotid trace by the smaller undulations, which occur previously to the larger one which follows the closure of the aortic valves. But it is rapidly extinguished where the arterial tension is high, so that in the radial pulse these percussion-waves are often already indistinguishable; hence the smooth character of the apex of a high-tension radial pulse, as taken in the ordinary manner by Marey's instrument; while, on the other hand, with low tension in the aorta, percussion effects are propagated so as to be visible in the radial trace, which there is a small copy of that of the greater vessels. As to the closure of the aortic valves, this produces the notch before that final elevation of the lever which, in its exaggerated form,

represents the "dicrotism" (of a fever pulse, for instance). If the valves close sharply, then the notch will be deep; if there be imperfection, sufficient to produce any considerable regurgitation, the notch will be slight. The character of the "diastolic collapse" (or the fall from the height of the pressure-wave to the bottom of the aortic notch) depends absolutely on the amount of resistance to the heart offered in the arterial and the capillaries. With extreme permeability of capillaries (*e. g.* in fever, anæmia) the radial artery empties itself considerably before the aortic valve closes; and to this abbreviation of the systolic expansion of the radial Sanderson gives the name of "capillary collapse." There is very low arterial tension here; such pulses cannot be properly taken unless the spring of the sphygmograph be very weak. The opposite condition of great capillary resistance is seen in those cases of chronic kidney disease which lead to hypertrophy of the left ventricle without valvular lesion; here the radial systole is prolonged, and the apex of the curve is much larger and squarer.

Thus, then, there are three principal peculiarities in the pulse-curves which are of great service in classifying their characters in disease:—(a) Peculiarities of the mode in which the arteries expand, consequent on altered relations between the force of the heart and the arterial resistance; (b) peculiarities in diastolic collapse—that is, in the mode in which the pulse is influenced by the closure of the aortic valves; (c) peculiarities in the mode in which the arteries empty themselves towards the periphery.

[The present is evidently a critical time in the progress of sphygmography; and as the new discoveries which are being made present some features which may be perplexing to those who are new to the study, I think fit to supplement the foregoing *résumé* by some remarks on the general results which are obtained so far. The first thing to which I shall direct attention is the important developments in the mode of application of Marey's sphygmograph which have been made. Not a little advantage has been gained in accuracy and ease of adjustment by Mr. Berkeley Hill's admirable pad above mentioned. But the supremely important observation which has been made independently by several observers is that, by a *more accurate proportionment of the pressure of the tactile spring to the power of the pulse*, very much larger and more developed curves can in many cases be obtained than those which M. Marey himself has portrayed. It is in this way that Wolff has arrived at the conclusions above given as to the characters of the normal and pathological pulse. These results were obtained by strengthening the spring in a manner which has been already described. Before seeing Wolff's book, however, I had myself arrived at the conclusion that, under certain circumstances, alterations of the weight of the writing-lever might greatly increase the size of the curves obtained—a heavy lever suiting a strong pulse, and a light lever a weak one. Recently Dr. Beigel and Dr. Burdon-Sanderson have each of them demonstrated the occasional advantage of suspending weights in such a position upon the writing-lever as to exercise more or less pressure; and Dr. Burdon-Sanderson and myself have constantly been in the habit of weakening the spring (to a degree which cannot be done by merely manipulating the screws) by placing

pledgets of lint or pieces of wood, &c., under the brasswork, so as to ease off the pressure, in taking very weak pulses. The demonstration by Wolff of the existence of two secondary elevations in the normal radial pulse, which was accomplished by his improved mode of application, derives additional interest and importance from the explorations of the carotid (first systematically carried out by Dr. Burdon-Sanderson), which have shown that the "grosse Incisur" of Wolff corresponds to the closure of the aortic valves, while the systolic portion of the curve may be occupied by one or several elevations, which are due to "percussion-waves," the occurrence of which is favoured by a low arterial tension in proportion to the heart-force. Another observation of practical importance, which has been made independently by Wolff and myself, is that the highly significant trace (under proper precautions) of delayed systole (the square-headed trace) may be spuriously manufactured by the instrument under either of two circumstances—(a) too great friction between pen and paper, and (b) too great resistance by the check-spring. The mistake may be easily avoided, but it is very necessary for us to be aware of its possibility. For my own part, I have come to the conclusion that the check-spring is quite useless, and have abandoned it.

The diseases in which it is now evident that the sphygmograph will prove of the greatest diagnostic value are these:—In aortic regurgitation, by estimating the amount of valvular imperfection; in discovering unsuspected commencing cardiac hypertrophy, senile disease of arteries, or capillary disease dependent on degenerative processes in the ultimate tissues; and, above all, in discovering the existence of intrathoracic aneurisms, and in deciding the locality of an aneurism. A striking example of the correctness of the instrument's indications in this respect is recorded in the "Hospital Mirror" of the 'Lancet,'* where I was able confidently to say, from a comparison of the two radial pulses, that an aneurism bulging the anterior triangle of the neck was not subclavian or axillary, but arose from the aorta or innominata. The post-mortem revealed the truth of this diagnosis.

Another branch of sphygmography which as yet has hardly been worked much, so far as I know, is its application to prognosis and to decisions as to treatment in the course of acute diseases. The results of a series of observations which I have made in fever, pericarditis, pneumonia, and especially in delirium tremens, are important; but they cannot be explained in a brief abstract, and they will shortly be presented to the profession in some lectures which I am to give at the Royal College of Physicians. It is enough to say here that the use of the instrument in these diseases appears to give far the most reliable indications which can be obtained as to the patient's chance of life in certain critical states, and also the best indications as to whether alcohol and some other important remedies will be useful or hurtful.—F. E. ANSTIE.]

Angina Pectoris.

Dr. Philipp† gives an account of a remarkable case of paroxysmal

* 'Lancet,' i, 1866.

† 'Berlin. Klin. Wochensch.,' 4, 1865.

recurrent angina pectoris (in a man of advanced age) of a rare type. Angina pectoris (Stenokardie) is, as he remarks, in its essence a neurosis; but it is unusual to find the nervous malady so completely uncomplicated with symptoms of organic, cardiac, or vascular disease as in the instance now recorded. The patient suffered for eight years with severe paroxysms, which were evidently connected merely with the condition of the nervous system, and which were more severe always during the state of depression induced by high summer heat. The eighth summer of the illness happened to be extremely hot, and the attacks began to take on a frequency and a severity which seemed to threaten a rapidly fatal issue. The patient had taken almost every conceivable medicine during the course of the illness, with only the most trifling and temporary benefit. In despair Philipp determined to try the effects of arsenic, and prescribed Fowler's solution diluted with an equal bulk of water; of this liquid five drops were given three times a day, after meals. The result exceeded all expectation. The medicine was soon tolerated well, and a great and immediate improvement took place. Not merely was the severity of the paroxysms so much mitigated that the patient almost ceased to complain of them, but the appetite, which had been very bad, greatly increased. After a month's use of the medicine Philipp made an attempt to discontinue it, and the rapid relapse of the patient towards his former condition proved that it was only to the arsenic he owed his comparative immunity. During a year and a half the treatment was continued, the patient always being comparatively well, except on the several occasions when the attempt to leave off the arsenic was renewed. At the end of this time, however, there was a sudden change, the attacks coming on with such frequency and severity that the patient could get no sleep, and again lost his appetite. Then the original attacks suddenly ceased, and symptoms of an acute brain affection showed themselves. There were general excitement and feverishness, pressure in the head, loquaciousness, and then somnolence, which lasted a few days, after which hemiplegia of the left side, with dragging of the mouth and impediment of speech; finally, loss of consciousness and incontinence of urine. The patient thenceforth remained comatose, with stertorous breathing, and died 25 days after the commencement of brain symptoms.

The remarkable effects of arsenic in this case, even though they at last failed (it should be mentioned that the dose was obliged to be gradually increased to about double the amount at first taken), are considered by Philipp to be very important; and he calls the attention of practitioners to the use of this drug in angina pectoris, especially of the uncomplicated nervous type.

Thrombosis and Pyæmia.

Mr. W. S. Savory* discusses the relation of these affections to each other in a long and able paper, of which we can only here give the conclusions:—"Thrombosis may exist without any evidence of phlebitis, and very often occurs without being followed by pyæmia. Phlebitis

* 'St. Barthol. Hosp. Rep.,' ii, 1866.

may occasionally exist without thrombosis, and often occurs without being followed by pyæmia. Pyæmia often exists without any evidence of phlebitis or thrombosis; still oftener it occurs without any evidence that it has been preceded by either of these, or by any other affection of the veins. It has, therefore, not been satisfactorily shown that either phlebitis or thrombosis stands, in any especial or peculiar manner, in relation to pyæmia, as cause and effect."

Other papers, &c., on diseases of the organs of circulation are—

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Gaz.,' Jan. 27, 1866). Waters, aneurism of the thoracic aorta greatly benefited by rest ('Brit. Med. Journ.,' Dec. 16, 1866). Wyss, on carcinoma of the heart ('Wien. Med. Presse,' 5, 1866), &c. &c.

E. DISEASES OF THE ALIMENTARY CANAL, PERITONEUM, ETC.

Dr. Mosler* describes the state of the parotid saliva in various diseases. According to Mosler, the saliva of the parotid gland does not contain sugar in diabetic patients. At the commencement of the diabetes it is alkaline or neutral, but is acid in acute diabetes and in cases which have reached an advanced stage. The acid reaction is not due to lactic acid, as has been supposed; it seems to be the cause of the affections of the gums, &c., which are frequently present in diabetic patients, and which do not occur while the urine is still neutral or alkaline.

In two cases of catarrhal icterus, and in a case of pleuro-pneumonia with hepatic derangement, the colouring materials and acids of the bile were present in the urine, but not in the parotid saliva.

In mercurial stomatitis the mercury is poured into the mouth with the parotid saliva, and irritates the mucous membrane, salivation being only a secondary result of the irritation of the sensory nerves.

In fevers, especially typhoid, the parotid saliva is scanty in quantity, and generally has no acid reaction. To this acidity Mosler attributes the inflammation of the parotid gland met with in the course of typhoid fever. He recommends catheterism of Stenson's duct as a means of arresting the swelling of the parotid and preventing inflammation.

M. Champouillon† writes on hypertrophy of the tonsils, and its influence on the development and health of children. When the tonsils, says Champouillon, have attained a large size they push before them and render immovable the velum palati and uvula; they more or less completely close the orifice of the nasal fossæ, and sometimes approach the one to the other so closely as to render the guttural opening a mere perpendicular fissure. These changes alter the voice and render deglutition difficult, and during sleep breathing is attended with râles or stertor. The mouth is generally dry and the breath fetid. The mucous membrane of the Eustachian tube becomes swollen, and produces more or less deafness. The impediment to respiration diminishes the amount of air inspired, so that the vesicular murmur is only heard distinctly at the apices of the lungs. The insufficient respiration renders the oxidation of the blood imperfect, favours anæmia, diminishes animal heat, and affects the elaboration of nutritive matter. In time hypertrophy of the tonsils produces a peculiar deformity of the chest, which was first described by Dupuytren in 1828. As the only efficient remedy, Champouillon recommends early removal of the enlarged tonsils, one or both; and he relates some cases in illustration of the efficiency of this treatment.

Dr. B. W. Foster‡ says that the most rational and most successful treatment in severe cases of gastric ulcer is to give the most complete

* 'Berl. Klin. Woch.,' 'Gaz. Hebdomadaire,' Sept. 14, 1866.

† 'Gaz. Médica,' 16, 1866.

‡ 'Brit. Med. Journ.,' June 3, 1865.

rest possible to the affected viscus, by stopping the supply of all nutriment by the mouth and supporting the patient for eight or nine days, or even longer, if necessary, by nutritive enemata. Perfect rest in the recumbent posture must be observed, the lips and tongue being moistened from time to time with a little water. The enemata should be small, from two to six ounces, and formed of milk, unscalded beef-tea, raw eggs in milk, given twice a day, with ten to twenty minims of laudanum.

Precisely similar treatment was recommended by Dr. Fuller in his lectures given before the Royal College of Physicians.

M. Hayem* gives a note on amyloid degeneration of the intestinal canal. Hayem founds his remarks on the post-mortem examination of the bodies of children who died in the Hôpital des Enfants Malades. Among forty scrofulous subjects, all having chronic suppuration of the bones, with or without tuberculosis, he found the amyloid degeneration in five. Other organs also were diseased in a similar way, and the lesion of these was anterior in time to the appearance of disorder of the digestive organs and diarrhœa. Hence the digestive canal becomes affected only at a very advanced stage of the disease. The lesion is always most intense in the lower part of the small and in the large intestine; the stomach, œsophagus, tongue, and tonsils, are rarely affected.

The disease presents two stages—one characterised by degeneration of the vessels of the mucous membrane and enlargement of the sub-mucous follicles, and the other by breaking up of the follicles and destruction of the mucous membrane at their level.

In the first stage the intestine is filled with more or less fluid, greenish, sometimes slightly serous matter. The mucous membrane is pale, and is covered by a rather thick layer of mucus, which can be readily removed by washing; this is simply a catarrhal lesion. The small arteries and the capillaries are thickened, especially in the vicinity of Peyer's patches and the solitary glands. These are tumefied, and form projections varying in size from a millet-seed to a grain of hemp-seed. At the same time the depression in the mucous membrane becomes exaggerated, and forms a more or less defined cup. The projecting bodies have a whitish, sometimes semi-transparent, aspect; they are of firm consistence, and do not collapse on being pricked. The lesion is distinguished by the thickening of the vessels around the follicles and by the production in them of a dark red colour on pouring iodine water over the diseased part of the intestine. At the same time a number of small vascular ramifications, not hitherto visible, start into view; so that the intestine, instead of being pale, appears in a state of more or less intense hyperæmia. The iodine solution also brings into view, more or less extensively, red and ramified lines along vessels which are not in relation with the agminated or solitary follicles; and in slighter cases these form the only indication of the lesion, the follicles being unaffected. Microscopic examination shows that, as in other tissues, the amyloid deposit takes place in the cellular fibres of the small arteries and on the internal surface of the capillaries. On making an incision

* 'Comptes rendus de la Soc. de Biol.,' 'Gaz. Méd.,' 6, 1866.

at the level of the enlarged follicles, and perpendicularly to their surface, they are seen to be surrounded by a large number of altered capillaries. These give off very fine transparent branches, which penetrate into the interior of the follicles. These small vessels, even in the interior of the follicles, have undergone amyloid degeneration. The follicle itself is filled with a number of small amyloid granules, and sometimes with a greater or less considerable amount of amyloid concretions. These alterations are in every respect comparable with that which the spleen undergoes in amyloid degeneration. In this first degree a small number only of the vessels of the submucous tissue are diseased, and in the mucous membrane and its glands catarrhal changes only are found. The disease is, in persons dying at this stage, generally most marked at the end of the small and in the large intestine. Generally, however, on examining the remaining part of the digestive canal, points may be found where the vessels of the mucous membrane have undergone degeneration; and there is usually enlargement, with a similar degeneration, of the mesenteric glands.

The second stage is characterised by the transformation of the diseased follicles, and the extension of the degeneration sometimes through the whole thickness of the alimentary canal. A short time after the swelling of the follicles the central depression gradually enlarges, and becomes surrounded with a yellowish circle. In a short time the follicle is replaced by small, more or less elevated circles, in which some thickened vessels end, and having in the centre a somewhat pulpy yellowish substance. In a more advanced stage this yellow matter disappears, the mucous membrane and the follicles no longer exist, and amyloid ulceration is established. These changes take place both in Peyer's patches and in the closed follicles; hence, there are generally developed two characteristic anatomical changes, which may be called amyloid *reticulated patches*, and *amyloid erosions, or ulcers*. The reticulated patches are due to the degeneration of Peyer's patches. Whitish prominent lines, circumscribing depressed spaces so as to give the appearance of a more or less fine lacework or honeycomb, represent exactly the distribution of the vessels which anastomose and ramify around the follicles in Peyer's patches. The meshes are smaller in proportion to the implication of the fine vessels in the degeneration. At the periphery are the vascular trunks which supply the patches, equally thickened. In the meshes the destruction of the follicles leaves either ulcers or considerable thinning of the mucous membrane. There is no inflammation in or around the patches; the intestinal mucous membrane is pale, anæmic, and covered with more or less mucus. On treating the patches with water containing iodine, the whitish lines immediately assume a brownish-red colour, which is changed to a bluish violet on the addition of a little sulphuric acid. The ulcerations and erosions of the watery follicles are the result of the same changes as are met with in Peyer's patches. They have the appearance of small depressions, or losses of substance, with neatly rounded borders. Sometimes it seems as if a round piece of the mucous membrane had been punched out. The slightly raised edge is furrowed with whitish vessels, of which the principal divisions are visibly thickened. The base is smooth, or a little

granular, and is formed of the submucous tissue; sometimes, when the ulceration is not complete, there are some yellowish *débris* of the mucous membrane. In other cases, again, there is only thinning of the mucous membrane, leaving a simple circular depression surrounded by thickened vessels. The presence of amyloid degeneration in the vessels of the follicle, and in those surrounding it, may be proved by the application of iodine.

Microscopic examination shows that the formation of the reticulated patches and of the circular erosions is due to molecular destruction. The mucous membrane of the follicles undergo granulo-fatty degeneration; and where erosions or ulcerations have occurred, the follicle disappears, either by granular and fatty disintegration, or by being thrown off after the disintegration of the mucous membrane. On making a section, perpendicular to the surface, of a reticulated patch or erosion, there are found—1. A loss of substance of mucous membrane, of which only granular and fatty *débris* remain. 2. A very advanced stage of amyloid degeneration of the vessels, which, on transverse section, appear as glassy cylinders, with an extremely small opening in the centre and a number of nuclei at the circumference.

In this advanced stage amyloid degeneration is found also in the other tissues of the digestive canal, in most of the vessels of the submucous areolar tissue, sometimes in the fat-vesicles, and also in the smooth muscular fibres. When amyloid degeneration is thus present the wall of the alimentary canal is notably thickened and firmer than natural; under the microscope it presents a large number of fibrils and deposits of a semitransparent, waxy, homogeneous substance, more or less obscuring the nuclei, and presenting the characteristic reaction on the application of iodine and sulphuric acid.

Degeneration of the vessels may be met with in various parts of the digestive canal. In one case it extended high into the small intestine. In other instances degeneration of the vessels of the mucous membrane of the stomach and duodenum has been observed; in another case the vessels and the unstriped fibres of the œsophagus were affected; and in another those of the tongue, especially around the glands at the base. In this latter case there was very advanced and general degeneration of the tonsils and of the vessels of the pharynx. The mesenteric glands are almost always affected; and, when the disease is far advanced, the vessels of the mesentery and peritoneum are found to have undergone change. In one instance the appendices epiploicæ, which appeared very firm, were also the seat of well-marked amyloid degeneration.

The evolution of amyloid degeneration in the intestinal mucous membrane may now be easily understood. The disease commences in the vessels, the first attacked being those of the mucous and submucous membranes, especially those which surround the follicles. Next follows enlargement and degeneration of the isolated and agminated follicles. The alteration of the vessels, extending more and more, and reaching the finest capillaries, diminishes their calibre, so as not only to produce anæmia, but to interfere greatly with nutrition; and it is then that the process of disintegration sets in, of which the results are the formation of the reticulated patches and erosions or ulcerations. This

process of destruction is the same as takes place in other organs, as in the kidneys and lungs, in which true caverns have been found in consequence of amyloid degeneration.

The principal symptoms produced are diarrhœa and hæmorrhage. The diarrhœa, which ordinarily attends the first stage of degeneration, presents in itself features distinguishing it from the diarrhœa met with in other cachectic conditions. But still there are some accessory peculiarities which may lead to the suspicion of amyloid degeneration. At the commencement the stools become gradually liquid, without increasing in number. The patient has only one or two daily; but the discharges are liquid and greenish, sometimes serous and whitish. When once established, the diarrhœa rarely presents remissions. It is not accompanied by colic nor by marked tenderness of the abdomen. Hæmorrhage, when present, is a more important symptom. Hayem has observed it in two cases, where the disease was found, on post-mortem examination, to have reached the second stage. The hæmorrhage probably arose from rupture of the vessels surrounding the follicles.

[See also Hayem (M. G.), changes in the adipose tissue in amyloid degeneration. 'Comptes rendus des Séances de la Soc. de Biologie;' 'Gaz. Méd. de Paris,' 1866, No. 10.]

Dr. W. Thomas* writes on intestinal invagination in children. In the last few years Thomas has met with 4 cases of intestinal invagination in children, from which he concludes that the affection is not so rare in early life as is generally supposed, and that many cases ending in recovery are probably overlooked or mistaken. The four cases referred to occurred in male children, aged respectively 22, 23, and 26 weeks, and $1\frac{1}{4}$ year. The seat of invagination was always the large intestine; and when a portion of the small intestine was involved it was always a few inches of the ileum, just above the valve. In three cases the invagination remained after death; the arch of the colon, from the cæcum to the sigmoid flexure, had disappeared; the small intestine in two cases passed immediately into the rectum, and in the third case into the lower part of the ascending colon. In the fourth case, on post-mortem examination, the intestines were found in their normal position, and the seat of the invagination was shown by the dulness of the serous covering of the transverse and descending colon, and the dark blue colouring and erosion of the mucous membrane at this part. In one case there was a double invagination. Signs of peritonitis were always absent. In regard to the symptoms and course of the disease, Thomas says that in each case the first symptom was vomiting, colic generally appearing at the same time. In one instance sanguineous evacuations appeared simultaneously with the vomiting, and in the other cases 3, 6, and 12 hours afterwards. In 3 out of the 4 cases Thomas was able to feel a tumour through the walls of the abdomen; it varied in size from a walnut to a pigeon's egg, was round or cordy, of doughy consistence, could be pushed a little aside, and gave a dull sound on percussion. The tumour was felt on the first

* 'Journ. f. Kinderk.,' 1866.

day, generally soon after the onset of the symptoms, but became more indistinct from the second to the third day.

An anal tumour, arising from the projection of the point of the intussuscepted portion, was observed by Thomas in 1 case 3 hours after the commencement of the affection, in another 2 minutes after a stool, in the other 2 cases the canal of the rectum was free. Pressure on the anal tumour was found by Thomas to nearly always produce pain, which is contrary to Rilliet's observation. The course of the disease was rapid. Death occurred in the four cases from the third to the fifth day, although one patient had fecal evacuations and in another the invagination was perfectly reduced.

The Peritoneal Friction-sound.

Seidel* arrives at the following results from the observation of a large number of cases:—Peritoneal friction-sounds may be produced in the situation of any of the organs contained in the abdominal cavity, or of any morbid growth which may be developed there. These sounds have not always the same semeiological meaning. In most cases they indicate thickening of the peritoneum, or morbid deposit on its free surface; much more rarely are they due to acute inflammation. In one of the cases related by Seidel a friction-sound was perceived in the hepatic region, a short time before the bursting of some cancerous masses into the peritoneum. In another case, one of endocarditis, a friction-sound was heard at the level of the spleen, in the arteries of which an embolus was arrested. The appearance of a friction-sound at this point may be of value in forming a differential diagnosis between certain cases of endocarditis and typhoid fever. In the latter disease it is extremely rare. M. Seidel has never observed it.

Among exceptional facts, Seidel cites cases of acute enteritis accompanied by peritoneal friction-sound.

In one very remarkable case, while the patient held his breath, a friction-sound was heard to be produced at the level of the stomach during each ventricular systole. The heart was hypertrophied, and its impulse was transmitted to the left lobe of the liver, producing a movement which, though slight, was communicated to the stomach.

Seidel's observations point out an important fact, that peritoneal friction-sound is regulated by the rhythm of the respiratory movements more frequently than is supposed. This may give rise to errors in diagnosis. Friction-sounds in the region of the liver and spleen, produced without strong external pressure, and when the respiratory movements are not much interfered with, appear almost always to be rhythmical with these. When the sound is intense, and its seat is at a short distance from the ear, it is heard distinctly beyond the point at which it is produced; when there is also pain in the part this pain is increased by the respiratory movements; and when friction-sound is observed in these conditions the mind is naturally led to consider the pleura affected, rather than the peritoneum.

Peritoneal friction-sound is a valuable sign in the history of syphilitic hepatitis and perihepatitis. The respiratory movements affect, not only

* 'Deutsch. Klin.,' 51, 1865.

the friction-sounds of the liver and spleen, but also those connected with the stomach and intestines. The uterus, the bladder, and fixed tumours, appear unaffected by them.

M. Seidel says that he has never met with a spontaneous non-rhythmic friction-sound. The peristaltic movements, which alone can produce such a sound, are generally impaired by peritonitis; and when opium is given in large doses, are almost completely abolished.

The characters of peritoneal friction-sound are very variable; it presents all the varieties met with in the pleura and pericardium. Its detection is often rendered difficult by the gurgling of the intestinal gases, and hence auscultation must be of longer duration than in other situations. Other difficulties arise from the propagation of the respiratory impulse, and from pain preventing sufficient pressure from being made with the stethoscope.

Ascites.

M. Desclaux* relates a case of ascites treated with success by iodine injection.—A woman, æt. 50, after repeated attacks of articular rheumatism, had œdema of the extremities, and afterwards ascites, for which paracentesis was performed on January 9, 1864. As there was trace of organic disease, Desclaux, believing the ascites to be dependent on rheumatic affection of the peritoneum, injected, on January 30, a mixture containing about half an ounce of tincture of iodine and 15 grains of iodide of potassium, in 3½ ounces of warm distilled water, allowing it to remain in the abdomen during two or three minutes. Severe pain, which soon abated, was felt in the left iliac fossa at the time of injection. There was no vomiting, no nausea; the urine was more abundant after the injection. Severe pain in the hypochondria set in on March 2, and was treated by embrocations of squills and digitalis, with cataplasms; and sulphate of quinine, infusion of cinchona, and purgatives, were given internally. As the pain, which was believed to have a rheumatic source, disappeared from the hypochondria, there was a renewal of the symptoms of rheumatism in the right knee, elbow, and shoulder. On April 9 the condition of the patient was in all respects satisfactory.

F. DISEASES OF THE SECRETORY SYSTEM.

Liver Diseases.

Dr. Grainger Stewart† writes on acute yellow atrophy of the liver, commenting on two cases.

Both the patients were pregnant females. In the first, a woman æt. 35, the signs of yellow atrophy of the liver were well marked; in the second the kidneys were principally affected. The tubules of those organs were distended, partly with epithelial cells, some brownish and containing much granular matter, others containing fatty molecules and globules, and others represented by groups of oil-globules enclosed in

* 'Union Méd.,' 122, 1865.

† 'Edin. Med. Journ.,' Oct. 1865; *ibid.*, Jan. 1866.

an indistinct and friable network. The stroma was somewhat enlarged, and contained numerous fatty granules. The kidneys, to the naked eye, were small, flabby, and congested; the cortical portion was diminished in size, and contained yellowish-white deposit. The liver was of natural size, soft, flabby, but not friable, and was found to contain cells having the characters of those met with in acute yellow atrophy. In commenting on his first case, Stewart gives his reasons for believing that acute yellow atrophy of the liver is not of hepatic, but of blood origin. The following considerations, he says, appear to him to point to this conclusion:—1. The blood was dark and fluid, and the muscles were dry, as they are in typhus fever and other blood diseases. 2. The spleen was soft and pulpy, as it is in many febrile blood diseases. 3. The fact that the kidneys and liver were affected by a peculiar and identical morbid process indicates that they were influenced by a common cause, that cause situated in the blood, and a form of fever poison. 4. The appearance, amount, and effects of the exudation, being different from what we see in simple inflammation, either of the liver or kidneys, indicates that some peculiar matter was present in the system, altering the ordinary processes. 5. The facts that the disease occurs so often during pregnancy, and that it seems to be induced by depressing mental emotions, indicate that it is of a constitutional origin. Stewart thinks, therefore, that we cannot help concluding that the affection is a blood disease, and that it leads to atrophy of the liver by diffuse exudation into the hepatic cells, which is followed by a rapid fatty degeneration. The second case, in which the kidneys were most affected, confirms Stewart in this view. Notwithstanding the small amount of disease in the liver, the patient had hæmatemesis; and Stewart suggests that this may be rather the result of a blood poison than of hepatic disease. The other circumstances in the case, which in his opinion favour the idea that the disease is of blood origin, were, the marked hypostatic congestion and rapid decomposition of the body, the darkness of the blood and its imperfect coagulation, the occurrence of identical morbid conditions in the liver and kidneys, and the peculiar nature of the process and the circumstances under which it occurred.

Drs. Steiner and Neureutter* write on fatty liver in children.—Of 222 children affected with adipose infiltration, or with fatty degeneration of the liver, Steiner and Neureutter found that in 131 the age was from 1 to 4 years. The pathological condition in the course of which fatty liver appears most frequently is tuberculosis; and the fact that in children this generally affects the lymphatic glands, and not the lungs, negatives the supposition that the excessive deposit of fatty matter in the liver in connection with tuberculosis is due to deficient oxidation. Steiner and Neureutter consider rather—agreeing to some extent with Frerichs—that the origin of fatty liver is to be sought rather in the change in the constitution of the blood induced by the tuberculous disease, and that the liver may be fatty from the commencement of the tuberculous process. Next in order to tuberculosis in connection with fatty liver is enteritis, which is not, however, to be regarded always as

* 'Jahrb. Kinderkrankh.,' 'Wien. Med. Wochensh.,' Dec. 6, 1865.

a cause. It may be preceded by the fatty disease, or, in many cases, the two diseases are very probably due to a common cause. The exanthemata may also be followed by fatty liver, and the connection between these is only to be found in the changes of the blood. Fatty liver is also observed in connection with diseases of the bones in children, such as tuberculous caries and rickets; also in cases of bronchitis, pneumonia, pleuro-pneumonia, and heart disease. Of the causes indirectly affecting the liver, diet holds a principal place, inasmuch as the children have either a diet very rich in fat, or (especially among the poor) one deficient in fat, but rich in hydrocarbons; and the mischievous influence of this diet is increased by want of exercise and pure air. The authors observe that adipose infiltration appears to be more frequent in children than true fatty degeneration, inasmuch as it was met with in 188 cases out of the 222 examined. They conclude that, in by far the greater number of cases, fatty liver is not to be regarded as a result of malnutrition of the hepatic cells, but as the result of causes acting from without.

R. Virchow* writes on the occurrence of icterus of blood origin, especially catarrhal icterus. He explains the views which more recent observations have led him to take regarding the origin of icterus, of which he recognises two kinds—1. Icterus of blood origin (*hæmatogenic*). 2. Icterus of hepatic origin (*hepatogenic*). The first kind is characterised by the presence of bile in the urine, while a jaundiced colour is absent both from the skin and from the liver. It arises from the disintegration of a large number of blood-corpuscles; and the choluria may be produced artificially, while it has not hitherto been found possible to induce an icteric colouring of the soft parts by artificial means. In *hepatogenic* icterus the liver-cells are always coloured. Virchow enters closely into the consideration of the relations of catarrhal icterus, of which the signs are not all equally demonstrable on the dead body. The turgidity of the mucous membrane produced during life by congestion of the vessels disappears, and with it a very important sign of obstruction of the ductus choledochus, where it runs between the coats of the duodenum. This Virchow designates the intestinal portion of the duct. The alterations which may be observed are of three kinds:—1. A certain amount of œdema of the tissues, which frequently occurs without hyperæmia or hæmorrhage. 2. The existence of a colourless plug, frequently consisting of mucus, but more frequently only of masses of epithelium. This may be easily expelled by pressure on the gall-duct, not on the gall-bladder; and its perfect freedom from colour shows that the passage of the bile has been arrested. 3. Sudden widening and biliary colouring of the whole of the remaining part of the ductus choledochus, with narrowing and almost total absence of colour of the mucous membrane of the intestinal portion. Catarrhal icterus, then, according to Virchow, always originates in the intestinal portion of the ductus choledochus, and to it belong icterus neonatorum and the icterus of pyæmia, pneumonia, typhus, and phosphorus poisoning.

* 'Virchow's Arch.,' xxxii, Hft. 1 1865; 'Canstatt's Jahresber.,' ii, 1866.

Lutten, in the 'Nouveau Dictionnaire de Médecine et de Chirurgie pratiques,'* says that the radical treatment of biliary calculus should be undertaken only in the intervals between the attacks of hepatic colic; otherwise the symptoms which require special management will only become aggravated. He first describes the treatment of biliary calculi, and then that of the symptoms which they produce.

1. To act on the calculi, solvents have been employed. *a.* Alkaline solvents are much to be preferred to all others; they have produced certain and permanent cures. Sometimes, under their influence, the calculi are broken up or really dissolved, and disappear without leaving any traces; but most usually they are expelled entire, in abundant bilious evacuations. This crisis, preceded often by violent hepatic colic produced by the treatment itself, is not always without danger. The alkaline treatment comprises various medicines, such as the fixed alkalies, soap-lye, salts of soda, carbonate of ammonia, vegetable salts of alkalies, &c.; but the most usual are the waters of Vichy, Vals, Carlsbad, Ems, &c. These waters are used in drinks and as baths; and they must be employed perseveringly, at different periods, during several years in succession. *b.* Durande's remedy consists in the administration of half a drachm to a drachm every day of a mixture containing fifteen grammes of sulphuric ether and ten grammes of oil of turpentine. Where it has succeeded, the calculus has been expelled without being dissolved; so that this remedy belongs rather to the class of expulsives than of solvents. Chloroform has been much vaunted by some; but its efficacy is very doubtful, and it only calms the pain. *c.* Purgatives, frictions, douches, shampooing, and electricity, have also been employed to favour the expulsion of calculi. Purgatives are preferable, especially sulphate of soda and castor oil. In diet the patient should use fresh laxative herbs, grapes, fruits, and whey. All fat should be excluded from the food; and the diet should be plain and properly proportioned, consisting of roast or boiled meat, vegetables, farina, lemonade, &c. Exercise is salutary, but its object is less to complete the combustion of fat than to favour the escape of the bile into the intestine.

2. In the treatment of the symptoms of biliary colic we should specially seek to assuage the pain. Opium may be given without fear, even in doses of two and one third or three grains; but subcutaneous injection of hydrochlorate of morphia is preferable. Belladonna, praised by Bretonneau and Lalotte, is not so good as opium, and should only be used when this fails. The same remark is applicable to cherry-laurel water and to tincture of castoreum. Chloroform, administered in inhalation until anæsthesia is produced, is a valuable remedy when paroxysms are most violent; it not only calms pain, but may lead to the cessation of the spasmodic contraction of the biliary passages, and thus favour the expulsion of the calculus.

Dr. Murchison† gives a valuable *résumé* of our knowledge of hydatid tumours of the liver, relates twenty cases which he has had an opportunity of examining either during life or after death, and gives his own

* Also 'Gaz. Méd. de Paris,' 15, 1866.

† 'Edin. Med. Journ.,' Dec. 1865.

views on the prognosis, diagnosis, and treatment of the disease. He believes that hydatid tumours of the liver occur more frequently than might be concluded from the autopsies of patients dying in hospitals. An hydatid tumour, he says, as a rule, gives rise to no symptoms, and causes little inconvenience, until it has attained such a size as to press on adjoining organs, or until it excites inflammation of the peritoneum; hence, small hydatid tumours are seldom diagnosed during life. Many of these tumours, without doubt, undergo spontaneous cure; the entrance of bile, or inflammatory action, or calcification of the outer cyst, destroying the echinococci and producing shrivelling of the cyst and conversion of its contents into a pultaceous material. This result is for the most part confined to small hydatid tumours. When the tumour has become large, this spontaneous cure is rare; the tumour continues to increase in size, probably slowly, and, unless it cause death by interfering with some important organs, it bursts in one of the following situations:—1. Into the cavity of the chest, more frequently than in any other direction. The contents may be discharged into the pleura, or, more rarely, into the pericardium, producing, almost always, death. The discharge may take place, after the formation of adhesions, into the right lung, and thence through the bronchial tubes; but, even here, pulmonary inflammation is generally set up, or the patient dies worn out by profuse discharge. Pleurisy may also be produced from an hydatid in the liver, without perforation, or from the development of hydatids on the thoracic surface of the diaphragm. 2. Into the peritoneum, producing sudden and almost always fatal peritonitis. The rupture is often caused by external violence, as a blow, fall, or strain. 3. Through the abdominal parietes or lower intercostal spaces. This is not a common mode of termination, but cases have been recorded in some of which the patients have recovered. Death may occur from exhaustion or from hæmorrhage from the interior of the sac. 4. Into the stomach or intestine. This, a rare mode of termination, is the most favorable, although death sometimes results from peritonitis. 5. Into the bile-ducts. The occurrence of this mode of termination is so rare that it has been doubted, but Murchison quotes several instances. The contents of the tumour may escape through the bile-duct, and recovery may take place, but the contrary result is the more common. In either case jaundice will probably be induced. The tumour may be converted into an abscess by the entrance of bile into the cavity. 6. In exceptional cases an hydatid tumour of the liver has burst into the inferior vena cava, and its contents, passing through the right side of the heart, have become impacted in the pulmonary artery and caused instant death. Independently of rupture, hydatid tumours may cause death by pressure on important organs, as the vena cava, bladder and meatus, or rectum; or on the thorax, interfering with respiration. Death may also occur from suppuration external to the cyst, and pyæmia; or from the formation of secondary hydatid tumours, and the consequent exhaustion.

From these considerations on the modes of termination of hydatid tumours of the liver, Murchison concludes that the risks are many, and the chances of recovery few. It is, therefore, important to consider

how they may be best treated when they have obtained a sufficient size to be recognised. Many remedies have been proposed, especially common salt and iodide of potassium, but Murchison gives good reasons for not believing in the efficacy of either of these. One expedient, however, holds out a fair chance of effecting a permanent cure, viz. puncture of the cyst and removal of its contents. The dangers of the operation are mainly two.—1. Acute peritonitis from the escape of a portion of the hydatid fluid into the peritoneal sac. 2. Suppuration of the cyst, owing, in some degree, to the admission of air. Both of these dangers may be avoided in a great measure by employing a very fine trocar. The dangers have mainly arisen when a large opening has been made, under the supposition that it was necessary to remove the secondary cysts, or because the tumour was thought to be an abscess. The removal of the liquid is sufficient to destroy both the present and the secondary cysts; and the subsequent injection of alcohol, iodine, or bile, &c., is unnecessary and may be injurious. The canula should be removed before all the fluid is drawn off, and the punctured portion of the abdominal wall pressed against the cyst. The patient should be kept recumbent, and perfectly still, during forty-eight hours, and an opiate ought to be given if there be the slightest pain. The operation is often followed by immediate relief from the sensation of tension and other unpleasant symptoms; sometimes there is uneasiness, or even pain and constitutional disturbance; but if the rules already given be attended to, they soon pass off. The fluid does not tend to reaccumulate, nor do the hydatid cysts undergo putrefaction.

Murchison holds that, in all cases where an hydatid tumour is large enough to be recognised during life, puncture should be performed at once. It is not advisable to wait for the formation of adhesions, or endeavour to induce them.

Speaking of the diagnosis of an hydatid cyst, Murchison describes it as a smooth, globular, elastic, painless tumour, growing slowly, without giving rise to constitutional disturbance, and, as a rule, not causing jaundice or ascites. Hydatid vibration—which is usually associated with the name of Piorry, but to which attention was first called by M. Briançon in 1828—is a sign the value of which Murchison thinks to have been greatly exaggerated. When present, it indicates the existence of a cyst, probably hydatid, but it does not indicate the presence of secondary cysts.

The diseases which may be most readily confounded with hydatids of liver are abscess, distended gall-bladder, effusion into the right pleura, aneurism, and cancer. Abscess of the liver is distinguished by its more rapid development, and by the existence of rigors, fever, and pain, with impairment of the general health. When there is suppuration of the cyst or peritoneal inflammation on its outer surface, an accurate knowledge of the previous history is requisite for the diagnosis. A distended gall-bladder is recognised by its shape and position, by the development being usually accompanied by attacks of biliary colic, and by the presence of jaundice in most cases. Extensive effusion into the right pleura may simulate an hydatid tumour, but the latter is more likely to be regarded as pleuritic effusion. The chief physical distinc-

tion is that the upper boundary of the dulness in pleuritic effusion is horizontal, while in hydatid tumour it is arched. These two morbid conditions may coexist. Aneurism of the abdominal aorta or of the hepatic artery is mainly distinguished by pulsation, bellows murmur, and, generally, the presence of acute neuralgic pains. Aneurism of the hepatic artery is also invariably accompanied by jaundice from pressure on the bile-ducts. Cancer of the liver is mainly distinguished by its irregular surface, tenderness and hardness, and the absence of elasticity or feeling of fluctuation. But several hydatid tumours may project so as to form an uneven surface or a cancerous tumour may present elasticity approaching to fluctuation. Where there is doubt an exploratory punctive may safely be made with a grooved needle or a fine trocar. Lastly, a large hydatid tumour may escape attention, especially if it proceed from the posterior part of the liver; and the diagnosis is sometimes rendered difficult by the pressure of the tumour on the bile-ducts or large veins, so as to produce jaundice, ascites, or anasarca of the lower limbs.

Kidney Diseases.

Dr. G. Harley* gives notes of 2 cases of intermittent hæmaturia, with remarks upon their pathology and treatment; and Dr. W. H. Dickinson† describes 4 cases of intermittent hæmaturia.

The chief peculiarity presented in Dr. Harley's cases was that the urine passed at one period of the day varied from a chocolate colour to an almost purple blackness, whereas at all other times the secretion was normal. One of the patients was a medical gentleman who had for many years been resident in a warm climate, where he had contracted malarial fever; the other was a Londoner who had never suffered from true ague, but in whose case the bloody urine was passed whenever he was exposed to cold. According to the patient's own statement, during the last two winters his urine invariably became bloody about an hour after his suffering from cold hands or feet. Both patients appeared to suffer from hepatic derangement; the first being slightly jaundiced when the urinary symptom manifested itself, while the other had an exceedingly sallow, bilious appearance. Dr. Harley observed that the varying condition of the renal secretion clearly pointed to intense congestion of the chylipoietic viscera of a transient and periodic character. The easiest way of establishing a correct differential diagnosis between intermittent and ordinary hæmaturia was that in ordinary hæmaturia the urine is not only coagulable by heat and nitric acid, but contains blood-corpuscles, which gradually become deposited on standing, and leave a clear supernatant liquid. In intermittent hæmaturia, as also in some cases of the non-intermittent variety, the urine, although coagulable by heat and nitric acid, contains few or no blood-corpuscles, and the colouring matter is not deposited on standing. Besides this, the urine contains numerous granular tube-casts, and has an increased per-centage of urea. While the usual remedies employed in the treatment of hæmaturia failed to make the slightest impression, mercurials and quinine caused it rapidly to disappear.

* 'Proceedings of Royal Med. and Chir. Soc.,' May 9, 1865.

† Ibid.

Dr. Dickinson's first case most fully reported was that of a patient in St. George's Hospital. In the autumn of 1859 he was one morning seized with shivering, nausea, and pain in the loins, and when he passed urine he found it was black and apparently bloody. From that time he had often been under observation at St. George's Hospital. He had no constant ailment, but his health was broken by short attacks of hæmaturia, which owned no other cause than exposure to cold. He usually went to his work apparently well. In cold weather he was liable to be attacked with shivering, retching, dull pain in the loins, and a feeling of lassitude. The testicles were retracted, and he had pain passing down the thighs. The urine was black and turbid, highly albuminous, of great specific gravity, and contained an excess of urea; the microscope showed numbers of dark granular casts, and a dark molecular deposit; no blood-globules had ever been found. The urine retained these characters for two or three urinations. Next day he was well, excepting that he was somewhat reduced by the attack. In continuous cold weather these attacks came on for several successive days, but they never lasted through the night. He had never had an attack in the summer; though once, in comparatively warm weather, it was brought on by washing windows with cold water. Movement had no tendency to produce it; he was always better when taking exercise, as it kept him warm. The man had an anæmic and cachectic appearance. No organic disease could be discovered. While in the hospital many plans of treatment had been tried, but none had appeared to prevent the recurrence of the complaint. Three similar cases were briefly reported, two of which had occurred in the practice of Dr. George Johnson and one in that of Dr. F. Cock. Dr. Dickinson maintained that the disorder was essentially due to an alteration in the blood, a similar state of urine having been found during typhus, and also in man and animals after the inhalation of arseniuretted hydrogen. The points which the disorder had in common with ague were adverted to, but the absence of any periodical tendency and the inefficiency of quinine, as shown in the case related, as a remedy, were cited as essential differences. Quinine, he believed, to be useless, except by palliating the effects of the loss of blood; while the administration of mercurials, both on general principles and on the experience afforded by the above case, was believed to be detrimental.

Perinephritic Abscess.

This affection, says M. Trousseau,* is comparatively rare, and when it exists frequently escapes early observation. The progress of the abscess is insidious and slow. There may be no local signs of the disease except pain, and the pain may be masked by the general symptoms which accompany it. The diagnosis of perinephritic abscess is, therefore, sometimes very difficult. In considering the causes of the abscess, it is necessary to take account of the anatomical relations of the part where it occurs. The kidneys are surrounded by much adipose cellular tissue. Their fatty capsules are in relation behind with

* 'L'Union Méd.,' 1865.

the crura of the diaphragm and the deep layer of the aponeurosis of the transversalis muscle. In front they are in relation with the ascending and descending colon; also they are in relation with the liver and the spleen. The fatty capsules are continuous with the cellular tissues of all the organs in the perinephritic region, the most important being the connection with the cellular tissue of the iliac regions. Hence it happens that the pus of perinephritic abscess will find its way with equal facility either into the subperitoneal or subaponeurotic cellular tissue. This continuity of tissues explains also the passage of the pus along the course of the iliac vessels down through Scarpa's triangle, or to the lesser trochanter, beneath Poupart's ligament. Moreover, the abscess may open at the point where lumbar hernia is sometimes observed. The several relations of the cellular tissue, in fact, explain the various directions in which perinephritic abscesses may run.

The etiology of these abscesses is complex. Often they have a traumatic origin wounds and blows, violent exercise or efforts, with exposure to cold, may cause them.

The abscess does not always occur immediately after the injury. In some cases it seems to form long after the receipt of the injury. Calculous diseases of the kidneys also frequently produce these abscesses. In such cases they are preceded by colic and an altered urinary secretion. Sometimes calculi are discharged with the pus, and may be felt in the kidney by a probe. Their removal has been even recommended; but modern surgery prefers allowing them to escape spontaneously with the pus. Hydatids also may cause the abscess. Abscesses also form in this region, as elsewhere, in cases of fever, &c., where there is what is called a purulent diathesis. Not infrequently they appear in puerperal women after delivery. It is worthy of note that when perinephritic abscess is accompanied with pleurisy or pleuropneumonia, the pleurisy is almost always on the same side as the abscess, indicating a continuity of tissue as the explanation. Pain even may of itself, it is reasonable to believe, produce perinephritic abscess.

Pain in the lumbar region is an important symptom, because for days and weeks it may be the only local symptom. There are also frequent febrile exacerbations, sometimes vomiting, and almost always great constipation and general weakness. After a time deep local swelling is perceptible. The tumour remains fixed during deep inspiration, showing that it is not connected with the liver. With the swelling there may also be extensive œdema of the lumbar, &c., regions. Whenever it is certain that abscess has formed it should be at once opened, to prevent the pus finding its way into the iliac fossæ, &c. Perinephritic abscesses have been known to open even into the pleura and lungs. When the abscess burrows extensively in this way it destroys the surrounding textures, and is generally fatal. Sometimes the pus may happily escape.

Pathology of Floating Kidneys.

Dr. Becquet* observes that of 35 cases of floating kidney collected by Fritz 30 were in women. The ages, with one exception, varied from 18 to

* 'Arch. Gén. Gaz. Méd.,' 5, 1866.

45; hence the idea that there was some relation between the development of the affection and the menstrual and reproductive functions. From observations of several patients Becquet is led to the conclusion that displacement of the kidneys is most frequently due to congestion of the organs, which is itself frequently dependent on congestion of the uterus and ovaries. The congested kidney increases in weight and size, and it is capable of obeying, to a certain extent, the laws of gravitation. The repetitions of the congestion constantly increase the amount of displacement, until the kidney may be felt beneath the anterior wall of the abdomen. When the hyperæmia disappears the organ may regain its normal place; but it may contract adhesions to the peritoneum, and so become fixed in its faulty position. The congestion of the kidneys and the consequent displacement give rise to severe pain, which may be mistaken for neuralgia, nephritic colic, &c. The displaced kidney forms a tumour, varying in position, but always capable of being easily felt and defined, so that there can be no great difficulty in the diagnosis. The use of tight stays, violent exercise, efforts, &c., co-operate with congestion in producing the displacement. When it is present antiphlogistics and calmatives must be employed. The means which appear best adapted to prevent or delay its return are, absolute rest during the catamenial period, the hydrotherapeutic treatment, certain mineral waters, the use of a proper bandage, &c. The conclusions at which the author has arrived are interesting, but require to be established by a more extensive series of observations, and by pathological examination.

Prof. Gilewski* writes on strangulation of floating kidneys. Gilewski believes the phenomena, described by Dietl as denoting the strangulation of floating kidneys, to be the results of pressure on the urinary canals. In persons who have floating kidneys severe pain occurs after sudden bodily exertion, when the stomach is overfull, or during menstruation; and on the same side of the abdomen may be detected a smooth, elastic, immovable, painful, rapidly increasing swelling, covered by the intestines. The patient has much uneasiness, with nausea, vomiting, fever, and scanty high-coloured urine. In two or three days there is a rigor, the urine becomes more abundant, and contains mucus and pus. The rapid increase of the tumour, its still more rapid disappearance as soon as mucus and pus appear in the urine, the absence of hæmaturia, and the subjective symptoms of retention of urine, indicate that the obstruction has been confined to the ureter, being produced by the pressure of the kidney itself on this tube.

G. DISEASES OF THE CUTANEOUS SYSTEM.

Mr. Jonathan Hutchinson† publishes an important paper on unilateral herpes, which is illustrated by a table giving the principal facts in the history of 63 cases of herpes zoster. The questions which he desires to solve are the following:—"Is herpes zoster an exanthem

* 'Oesterr. Arch. f. prakt. Heilk.,' 1865.

† 'Lond. Hosp. Reports,' vol. iii, 1866.

or a neurosis? If an exanthem, why, then, is it not symmetrical—not attended by constitutional disturbance—not liable to spread by contagion? If a neurosis, why should it not relapse—why should it have stages—and how can it protect an individual against a second attack? My own suspicion is that it belongs to neither of these classes, but that it constitutes a new group by itself; and further, I feel convinced that whoever may succeed in unravelling the mystery which at present surrounds it must, at the same time, make a discovery in physiology.”

Hutchinson makes the following observations as the result of his experience:—1. *H. zoster of the trunk* may occur at almost any age, and (early infancy excepted) is equally frequent at all periods of life. *H. frontalis* appears to belong chiefly to advanced life, so far as the few cases collected by Hutchinson (14 in number) can decide the question. 2. The two sexes are equally liable to the complaint. 3. It is not possible to denote any special condition of general health which predisposes to the disease. 4. *H. zoster* is not contagious. 5. As a general rule, it does not occur twice in the same individual. Hutchinson has only once seen such an occurrence; the recorded instances are few, and in all of them there has been an interval of many years. 6. In true *h. zoster* the eruption is, with the rarest exceptions, never symmetrical. Hutchinson has only seen one case; in this it appeared on the right chest and on the left forehead. But there is a syphilitic form which really is symmetrical, which is seldom limited to the chest, and which is much longer in disappearing than true shingles. 7. *H. zoster* occurs with equal frequency on the two sides. 8. It generally observes closely the recognised anatomical distribution of some nerve; this nerve is usually a cutaneous one, *but not always*. The occasional exception is not merely rendered probable by the frequent occurrence of deep-seated pain, extensive swelling, muscular stitches, &c., but by the positive evidence afforded by a most interesting case in Hutchinson's practice. In this case the patient, a man *æt.* 63, first had slight conjunctivitis, then some pain in the scalp, then herpes of the painful part, which subsequently extended to the side of the nose and the upper part of the whisker. The conjunctiva became swelled; there was iritis, with effusion of lymph, and patches of corneal opacity. It is very interesting to note that the sensibility of the painful scalp (as tested by a pin-prick) was sensibly diminished. 9. Unilateral herpes can probably be produced, in some subjects, by the medicinal use of *arsenic*. 10. The disease runs a definite course. Hutchinson emphatically endorses the statement of Bateman, that “the shingles commonly follow the regular course of fever, eruption, maturation, and decline, within a limited period, like the eruptive fevers or exanthemata of nosologists.” When the eruption ends in ulcers, however, healing may be indefinitely delayed if these are deep. There is never any fresh production of vesicles, however, during this stage.

The questions which Hutchinson suggests as still requiring investigation are the following:—1. Why are the dorsal nerves, especially the third or fourth, so much more frequently affected than any others? 2. Why does the eruption so frequently follow certain branches of the

ophthalmic division of the fifth, and so seldom those of the second or third division? 3. Why are the forearms and legs so rarely affected? 4. Does not nervous irritation begin centrally, or at some point external to the centres? 5. What share has the vaso-motor nerve in the production of the symptoms?

In conclusion, Hutchinson alludes to a different form of herpes also plainly connected with the nervous system, which he calls "symptomatic herpes." This usually occurs on the lips, but may be seen also on the nose, and sometimes on the cheeks; it is not infrequent on the prepuce. It is very often symmetrical, though rudely so. It goes through stages exactly like *h. zoster*; but may occur again and again in the same person, and, unlike unilateral herpes, rarely or never bears scars. It may be observed in any illness in which a rigor has occurred (spasms of arteries, epilepsy of arteries), and is thus often seen:—
1. After introduction of catheters. 2. In erysipelas. 3. In ague. 4. In pneumonia. 5. In fever. 6. In any inflammation of a shut sac. 7. Very commonly in ordinary catarrh.

In relation to the share which the nervous system takes in the production of unilateral herpes, an observation recorded by Pivain* is of great interest. An old man had attempted to kill himself with the fumes of charcoal, and was brought into the hospital with symptoms of lung and brain congestion. On the eleventh day an eruption of *h. zoster* appeared on the left side of the face and head, following the branches of all three divisions of the trigeminus.

Dr. Pundschuf records a case of herpes zoster of the trunk, apparently caused by exposure to cold, in which (as in several cases which have been recorded by Hutchinson and others) the decline of the vesicular eruption was followed by an acne-like rash. The after neuralgia was particularly severe and lasting in this case.

Dr. M. Singer† records a case of *H. zoster* following all 3 branches of the fifth, and in which it was observed that the two senses of touch and taste in the tongue disappeared and reappeared in strict unison, thus giving strong corroboration to the idea that the lingual is a nerve of taste.

Dr. Crépinel§ says that he has found great benefit in the treatment of neuralgia in *h. zoster* from the local application of chloroform and oil (1 part to 5) some 5 or 6 times daily. The proportion of chloroform is to be increased when the pain is very severe. The remedy should be applied at as early a stage of the complaint as possible.

Dr. P. Gerhardt says that the group of diseases in the course of which zoster facialis is frequently observed is distinguished by the frequency of an initial rigor, or the occurrence of an increase of temperature, even to 32° Réaum., even on the first day. Gerhardt remarks that this affection does not attack the trunk or limbs, but only the face, and thinks that the irritation must be caused by the following peculiarity of the fifth nerve:—The branches of this nerve run through

* 'Schmidt's Jahrb.,' 127, p. 24.

† 'Wien. Med. Presse,' 30, 1865; 'Schmidt's Jahrb.,' 128, p. 48.

‡ 'Wien. Med. Wochensch.,' 56—59, 1865; 'Schmidt's Jahrb.,' 128, p. 49.

§ 'Bull. de Thérap.,' Août 30, 1865; 'Schmidt's Jahrb.,' 128, p. 50.

narrow bony canals, along with small arteries; these arteries contract in the initial rigor, but then *dilate*, and their abnormal size creates a pressure on the branches of the trigeminus and the sympathetic. The occasional result of the damage to the latter is the occurrence of a vesicular eruption on the skin. He thinks that when this has once occurred an accommodation takes place, in virtue of which a second attack of febrile dilation of the vessels does not irritate the vaso-motor fibres so as to cause the eruption. It is notorious, for instance, that in intermittent fever herpes only occurs once; as a rule, between the second and third cold fits.

Here we are obliged to stop, our space being exhausted. We can only enumerate the following papers as the most important on skin diseases which have appeared:

Virchow, on molluscum contagiosum ('Virchow's Arch.,' xxxiii, 1, p. 144). [Virchow regards the disease as a hyperplastic epithelioma, whose lobular glandlike structure is produced by over-formation in the epidermoid lining of the follicles. He inclines to agree with Bateman and Paterson, that the fat-like corpuscles which form the secretion of the epitheliomata are the vehicle of contagion.] Mosler, two cases of "hide-bound" skin ('Virchow's Arch.,' xxxiii, 3, p. 321, 1865). Fouquet, on urticaria tuberosa ('Berl. Klin. Woch.,' Aug. 7, 1865). [Fouquet has observed five cases of this rare disease. It exclusively attacks women, and is intimately connected with the sexual functions, especially with pregnancy, lactation, &c.] Purser, Dr. J. M., two cases of onychomycosis, with descriptions of the parasitic formations present ('Duh. Journ.,' Nov. 1865). B. Wagner, case of parasitic disease of finger-nails ('Schmidt's Jahrb.,' 129, p. 178). Ripping, on cases of the same (ibid., p. 177). Betz, on the treatment of syphilitic paronychia. [Betz removes the nail, and then firmly encases the whole finger, or toe, in stimulating plaster, and (in spite of the pain) does not remove this oftener than once a week.] Stark and Hallier, on the parasitic growths in favus and herpes ('Jen. Ztsch. f. M. u. Natw.,' 1865; 'Schmidt's Jahrb.,' 130, p. 27). Hebra, Ganeke, L. Landois, on phthiriasis [lousy disease] ('Wien. Med. Wochenschr.,' 17—19, 24, 25, 27—29, 1866). L. Landois, on the same ('Ztsch. f. Wiss. Zool.,' 1865). Hebra, on the same ('Wien. Med. Presse,' 31—36, 1865). Furneaux Jordan, on eczema of the eyelids, conjunctiva, and cornea ('Lancet,' Jan. 21, 1865). [The author's object is to show that ophthalmia tarsi, granular lids, a peculiar swelling of the subintegumental connective tissue of the lids, lippitudo, strumous ophthalmia, certain forms of simple or catarrhal ophthalmia, keratitis and strumous keratitis, and certain ulcers in the cornea, are merely varieties of eczematous disease.] Hillier, on the lichen ruber of Hebra ('Lancet,' July 21, 1866). Milton, on the treatment of eczema ('Med. Times and Gaz.,' May 27, 1866). [Lowering means quite useless; arsenic only given in last stage; cod-liver oil is invaluable, and should be given for from three to six months; but iron is the best remedy, in the form of muriate.] Tilbury Fox and Purser, herpes circinnatus contracted from favus in the cat ('Med. Times and Gaz.,' Nov. 17, 1866). Balmano Squire, psoriasis, in relation to pregnancy, lactation, and the puerperal state ('Med. Times and Gaz.,' July 7, 1866). McCall Anderson, on psoriasis and lepra (being part iii of 'Contributions to Dermatology.' Churchill, 1865, pp. 65). Eulenburg, on chronic pemphigus ('Berl. Klin. Woch.,' 34, 1865). Bergeron, on tinea tonsurans and favosa ('Ann. d'Hygiène,' Janv. 1865). Bryant, case of elephantiasis of the thigh and leg cured by ligature of external iliac ('Med.-Chir. Trans.,' 1866), &c. &c.

In concluding his task, the Editor of the foregoing "Report on Practical Medicine" begs to express his regret that certain circumstances, over which he had no control, have prevented his making it what he could wish. The work was put into his hands very late in the

day, and he has thus had to struggle with unusual difficulties in adapting himself to a new task. It must at all times be difficult to present, in so short a space as this 'Retrospect' affords, a really efficient résumé even of the more important medical novelties which have appeared in the course of two years, especially when those years have been so eventful, in the character of their prevailing diseases, as those whose history has now been dealt with. The Editor therefore hopes for some indulgence from those who criticise a work which has been done under several important disadvantages.

REPORT ON SURGERY.

BY

T. HOLMES.

THE following extracts refer to new inventions in surgery which have appeared since the date of the last 'Year-Book,' and which appear likely to come into general use.

*Acupressure**.—Sir J. Simpson's proposal to substitute temporary pressure by needles and silver wire for permanent inclusion in a flexible ligature is, no doubt, familiar to most of our readers; but as it was not included in the last 'Year-Book' (that for 1864, Sir J. Simpson's work having only appeared quite late in that year), we feel it necessary to lay before our readers the main particulars of the method, and some account of the published experience of those surgeons who have used it.

In a publication like the present we can only briefly advert to a very few of the main features of Sir J. Simpson's volume of nearly 580 pages. His proposal may be put in a few words as follows:—The ligature of vessels, as practised since the time of Ambrose Paré, though a great improvement on the old plan of restraining hæmorrhage by escharotics and styptics, is yet defective, inasmuch as it involves the sloughing and reparation by an ulcerative process of the tissues (*viz.*, the vessels and the adjacent structures sometimes) embraced in the knot, and thus renders primary union of the wound impossible; besides that, when the ends of the ligatures are left hanging out, they interfere with the union of the edges, as foreign bodies. Several occasional drawbacks of the ligature are also pointed out by Prof. Simpson, *e.g.* that they may cause secondary hæmorrhage, that they may remain immovable for a length of time, &c. He also raises the question whether the complications of wounds (pyæmic and others) may not often be caused by the ulcerative process set up by the ligatures. Now, all these various inconveniences would, he thinks, be avoided by substituting for the permanent ligature the temporary pressure of a metallic body, which is to be withdrawn after a time sufficient to allow of the coagulation of the blood in the vessels. This he effects by passing a

* Sir James Simpson, 'Acupressure; a New Method of arresting Surgical Hæmorrhage, and of accelerating the Healing of Wounds.' Edinb. 1864.

needle through the tissues near the vessel in such a manner as to compress it. The needle may be used in one of three different manners:—1. Either the needle may be passed in and out over the mouth of the vessel so as to compress it, as a flower-stalk is fastened to the lappet of a coat; or, 2, after the needle has been passed in this way perpendicular to the course of the vessel, it may be turned through a quarter of a circle before its end is buried in the tissues; or, 3, after the needle has been passed under or over one end of the artery, its point being still left outside the flesh, the loop of a silver or silk ligature may be cast over the point, and its other ends over the shaft of the needle, and twisted so as to compress the vessel between itself and the needle, the end of which is then thrust into the flesh. In all the plans either the end of the needle must project from the wound or, more commonly, a string connected with it must so project, and the ends of the noose of wire must also be drawn out of the wound. After a certain number of hours, varying from 6 to 48 or 72, according to the size of the artery, the needle is withdrawn by drawing on its end, or on the string attached, and this frees the loop when the latter is used. There is then no foreign body left in the wound, and Prof. Simpson gives a number of cases to prove that the latter may often, even in a considerable amputation, unite by first intention, which he justly asserts to be an impossibility under the common method, and also to show that wounds heal more rapidly and more kindly after acupressure than when the ligature is used.

The method is applicable, not only as a hæmostatic in surgical wounds, but also (1) as a precautionary measure in operations, which may be made comparatively bloodless by previously passing a needle under and compressing the chief artery or arteries leading to the part; (2) to compress the artery leading to an aneurism, after it has been exposed by the necessary incisions; (3) to secure the vessels in the pedicle of the tumour in ovariectomy.

We must refer to Sir J. Simpson's work for the details of these matters, which, no doubt, are known to most of our readers, our main object being to quote the experience of those who have endeavoured to follow out the recommendations of the author.

Prof. Pirrie relates his experience of the method in the 'Med. Times and Gaz.,' July 1 and 8, 1865. After giving a minute account of the various methods in which the needle may be employed, he proceeds to tabulate 13 cases in which he has used it, viz., 6 amputations of the thigh, 1 of the leg, 3 of the breast, 1 excision of the elbow, 1 castration, and 1 wound.

Prof. Pirrie declares, in the first place, his conviction that acupressure is a perfectly reliable surgical method of checking hæmorrhage. It also appears to him to have the advantages of being the quickest, the easiest of application, and the safest means yet devised for that purpose. "That the vessels in a large amputation," says Prof. Pirrie, "can be acupressed in a much shorter time than they can be ligatured, I am perfectly satisfied, and in cases where every drop of blood is precious it seems to me, that to do all that can be done to preserve life, as far as saving of blood has influence, it is the duty of the surgeon in all

suitable operations to give the patient the benefit of this new proceeding. But shortening the period occupied in arresting hæmorrhage is not only important for diminishing one of the real dangers of an operation, namely, that from loss of blood, but also for lessening the risk of the more remote dangers from suppuration, and many distressing results of the higher grades of the inflammatory process in the stump. I have long thought we are too apt to forget that living tissues are resentful of even slight injuries, and that we are not sufficiently careful to use the sponge as seldom and as gently as possible. Whatever shortens the period of hæmorrhage must diminish the risk from frequent touching of the parts.

"That acupressure can be applied with the greatest facility and ease any surgeon may satisfy himself by giving it a trial. For arriving at a just appreciation of acupressure, one of the most important points to be determined is, the effect of its use on the frequency of pyæmia, which is admitted by all to hold a high place among the causes of death after great operations. It is only by the careful observation and record of a long series of cases that this question can be definitely determined. It will, however, be generally admitted that whatever promotes primary union diminishes, and that which induces suppuration increases, the tendency to pyæmia. Primary union never does nor can take place throughout the whole of a wound where the arteries have been ligatured; but where they have been acupressed that desirable result is often obtained, and the risk of the occurrence of pyæmia entirely obviated. Whatever be the alterations which take place in the blood in pyæmia, and whether the morbid matters are absorbed, imbibed, or generated in the blood, passing through an unhealthy inflamed tissue, there can be no doubt that for the occurrence of pyæmia inflammation of, or having a tendency to assume, a suppurative character is absolutely necessary. The presence of purulent irritating and decomposing materials, and more or less of devitalized tissue at every point of deligation, renders it highly probable that the risk of pyæmia is much greater after ligature than after acupressure, which does not usually give rise to these untoward local results. Acupressure requires a far briefer sojourn of the foreign body in the wound; the obliterating foreign body is safer and less irritating, because it is of a metallic and not of a textile nature, and the acupressure needle does not cause that mechanical division and strangulation of the arterial coats which is the inevitable result of the application of the ligature.

"I considered it a duty to give acupressure a fair trial, I wished to form an unprejudiced judgment regarding it; and the conclusion at which I have arrived is, that it has many and great advantages over the ligature; I have therefore resolved, in all suitable cases, to give it the preference."

In the 'Edin. Med. Journ.,' July, 1865, p. 39, Dr. Watson treats of "acupressure as a hæmostatic agent." The operations in which he used acupressure are nine in number. Some of them have previously been published, or alluded to in the 'Lancet' for April 1, 1865. They are of a miscellaneous nature—some of them of much gravity (for instance,

one of amputation of both legs), while others are slight operations, such as chronic mammary tumour. Three of the patients died, but from causes which in Dr. Watson's judgment were unconnected with the hæmostatic method employed, viz., one from peritonitis after the operation for strangulated hernia, one from erysipelas connected with a scalp wound,* and the third of pyæmia after amputation of the forearm, but whether connected with the amputation itself or with a bed-sore which existed on the nates is doubtful.

Dr. Watson deduces, from these cases, the conclusion that acupressure is a safe and efficient method of restraining hæmorrhage. In 2 of his cases there was bleeding after the operation, but not from vessels secured by the needles, except in one instance, where some slight oozing occurred as one of the needles was being withdrawn, and it was reapplied successfully. He believes also that the acupressure needles are readily applied in most cases, and offer some advantages over either the ligature or torsion of the arteries. As to the effect of acupressure on the union of the wound, Dr. Watson believes that it is very favorable to rapid union, although none of his cases were instances of primary union, in the very strictest sense of the term, *i. e.* union without the formation of a drop of pus; nor does Dr. Watson believe that such union occurs, except very rarely. Four of his cases healed very rapidly, their progress being, he says, "very different from what I had ever previously obtained." From his experience, therefore, it is not wonderful that Dr. Watson deduces the conclusion that "the employment of acupressure, in one or other of the methods suggested by Dr. Simpson, is safe, satisfactory, and well worthy of an extended trial."

Dr. Gillespie ('Edin. Med. Journ.,' June, 1865) has also used the method of Prof. Simpson at the Edinburgh Infirmary. His judgment of it agrees in the main with Dr. Watson's; but he gives several cases in which it has acted less satisfactorily than in those treated by that gentleman. Thus, in a case of amputation of the arm 11 needles were used, and one of them got entangled with the others and locked them in, so that, on the seventh day after the operation, it was found necessary to liberate the needles by seizing this one by the point, and dragging it out, wire and all, through the stump. Dr. Gillespie says, "This case illustrated well some of the difficulties which may be met with by trusting exclusively to acupressure. Eleven needles, crowded into such a small space, though great care was taken to keep their accompanying wires in the axis of their insertion, got wedged in, so as to cause much pain and trouble ere they were moved. You may also remark that suppuration showed itself at as early a period as usual, so no gain whatever, but rather the reverse, in this instance, seems to have followed the substitution of acupressure for the ligature." Dr. Gillespie also gives a case in which he believes that secondary hæmorrhage was caused by the needle pressing upon the femoral artery, and another in which, as hæmorrhage occurred when he wished to withdraw the needles,

* This was a patient who had had both legs amputated primarily. The case does not seem to have gone on well, as there had been a good deal of secondary hæmorrhage and sloughing of one of the stumps.

he found it necessary to tie the arteries. He is not opposed to the use of acupressure in flap amputations, though he does not appear to consider the method as superior to the ligature. It is especially useful, according to him, in cases where the tissues are much softened by disease, or the arteries retracted in positions where forceps can with difficulty reach them.

In the 'Med. Times and Gaz.,' Jan. 14, 1865, Dr. Keith reports a case of amputation with acupressure.

Prof. Weber, of Bonn, as quoted by the 'Med. Times and Gaz.,' 1865, i, p. 478, from the 'Handbuch der Allg. u. Spec. Chir.,' part I, Erlangen, 1865, says, "I shall only remark as to acupressure, that experiments on the lower animals have shown me that when it is really efficient it cuts through the vessel just as the ligature does, and that this division takes place much more rapidly than when the ligature is employed. I have assured myself by unprejudiced experiments that suppuration through the arterial coats takes place much more quickly by this method. Sometimes 48 hours is sufficient. It is evident that no extra security is given by this. On the other hand, if we take away the needles too soon, we cannot be certain that the arteries are firmly closed. I have several times, after taking away the needles before the second day, seen such violent hæmorrhage that I was forced to ligature."

On the other hand, Mr. Lawson Tait (in the same journal, p. 502) gives a direct denial to Prof. Weber's statements. He says that he has "been engaged during six months in a series of experiments on the lower animals, and has come to conclusions exactly the opposite of Prof. Weber's."

In the 'American Journal of the Medical Sciences,' July, 1865, p. 276, there is published under date of Sept. 1864 a proposal by Dr. Aitken, of Tekonsha, Michigan, entitled "Compound Acupressure a substitute for the Ligature." The artery is to be compressed for a period of between 6 and 24 hours, between two needles, 2 or 3 inches long, of the size of common darning needles, or smaller, of steel, rather brittle or soft tempered in the outer or free portion, so as to be readily cut. The extremity of one has an eye, bent in a short curve, and the corresponding end of the other is fitted to the eye, and has a notch to interlock with it. The method is thus described:—"The first steps are the same as for ordinary ligature, until the vessel is reached, when the eye of the first needle (instead of the aneurism needle, but with its aid if necessary) is passed under the artery until the notch of the second can be engaged in it, when they are approximated sufficiently to bring together the inner wall of the artery, and so obliterate the channel. A few turns of silk around the needles, at the surface, will make them secure, and the projecting ends may be removed with the nippers." The method of withdrawing them is obvious, and need not be transcribed. The advantages claimed are the same as in Sir J. Simpson's method. It is not stated whether Dr. Aitken has put his method in practice.

On a New and Ready Method of producing Local Anæsthesia (Dr.

Richardson, 'Med. Times and Gaz.,' i, pp. 115, 169, 249, 277, 1866).—The following is Dr. Richardson's account of the method which he introduced for producing local anæsthesia by means of the vapour of ether. It is, perhaps, hardly necessary to add that the method has since become very general in minor operations, and that some even of the major operations have been performed under its use, as Cæsarean section and ovariectomy.

"When the toy for diffusing eau-de-cologne in fine vapour over the skin in the form of spray—which some time ago found its way into our drawing-rooms—first came before me, it struck me at once that it might possibly be applied to the production of local anæsthesia; and I set to work to try its applicability in this respect. I was soon afterwards assisted largely in my labours by taking advantage of Siegle's apparatus, with the hand-ball spray-producer invented by my valued friend Dr. Andrew Clarke.

"With this apparatus I set myself to determine the degree of cold that could be produced by the vaporization of all the known volatile liquids, and I determined the fact that the intensity of the cold produced held a definite relationship to the boiling-point of the fluid used; the rule being that the lower the boiling-point the greater was the amount of cold exhibited. In these inquiries I employed a very delicate thermometer, directing the spray upon the bulb from half an inch to an inch and a half from the point of the jet. By these means I learnt that with rectified sulphuric ether I could bring down the thermometer within 10° Fahr. of zero, and that by directing the jet on the skin I could produce a certain definite and marked degree of local insensibility, but not sufficient for surgical purposes."

Dr. Richardson then proceeds to relate how he attempted to produce a higher degree of cold by combining ice and salt with the ether in Siegle's apparatus, and how this failed, in consequence of ice collecting in the tube, derived from the water of the atmosphere.

"By this time I had been led, very reluctantly, to the fact that the use of ice and salt for reducing the ether was a failure when the plan came to be tried in practice, nor could I see any ready way of preventing the difficulties that were brought before me. Added to these difficulties there was another, which has always attended my friend Dr. Arnott's plan, viz., that of getting the ice and salt readily for operation. To succeed, therefore, it was requisite to dispense with ice and salt altogether.

"In considering how this object could be achieved, it occurred to me that if a larger body of ether than is supplied by Siegle's apparatus could be brought through the same jet, by mechanical force, in the same interval of time, and with the same volume of air, a proportionate increase of cold must necessarily be produced. The theory was one of pure physics, admitting even of arithmetical demonstration, and running parallel with the lessons which had been taught me with respect to the cold produced by liquids having different degrees of boiling-point. The theory was put to the test at once, and proved correct to the letter. By driving over the ether under atmospheric pressure, instead of trusting simply to capillary action—or to suction, as in Siegle's apparatus—the spray evolved brought the ther-

mometer within thirty seconds to four degrees below zero—the result that was desired.

“Ascertaining this truth, I instructed Messrs. Krohne and Sese-mann to construct a proper apparatus. It consists simply of a graduated bottle for holding ether; through a perforated cork a double tube is inserted, one extremity of the inner part of which goes to the bottom of the bottle. Above the cork a little tube, connected with a hand-bellows, pierces the outer part of the double tube, and communicates by means of the outer part, by a small aperture, with the interior of the bottle. The inner tube for delivering the ether runs upward nearly to the extremity of the outer tube. Now, when the bellows are worked, a double current of air is produced, one current descending and pressing upon the ether, forcing it along the inner tube, and the other ascending through the outer tube, and playing upon the column of ether as it escapes through the fine jet. By having a series of jets to fit on the lower part of the inner tube, the volume of ether can be moderated at pleasure; and by having a double tube for the admission of air, and two pairs of hand-bellows, the volume of ether and of air can be equally increased with pleasure, and with the production of a degree of cold six below zero.

“By this simple apparatus, at any temperature of the day and at any season, the surgeon has thus in his hand a means for producing cold even six degrees below zero; and by directing the spray upon a half-inch test-tube containing water, he can produce a column of ice in two minutes at most. Further, by this modification of Siegle’s apparatus he can distribute fluids in the form of spray into any of the cavities of the body—into the bladder, for instance, by means of a spray-catheter, or into the uterus by a uterine spray-catheter.

“When the ether spray thus produced is directed upon the outer skin, the skin is rendered insensible within a minute; but the effects do not end here. So soon as the skin is divided the ether begins to exert on the nervous filaments the double action of cold and of etherization; so that the narcotism can be extended deeply to any desired extent. Pure rectified ether, used in this manner, is entirely negative; it causes no irritation, and may be applied to a deep wound, as I shall show, without any danger. I have applied it direct to the mucous membrane of my own eye, after first chilling the ball with the lid closed.

“I wish it to be distinctly understood that at the present moment I only introduce the method here described for the production of superficial local anæsthesia. It is, I believe, applicable to a large number of minor operations, for which the more dangerous agent, chloroform, is now commonly employed; I mean such operations as tooth extraction, tying nævus, tying piles, incising carbuncles, opening abscesses, putting in sutures, removing small tumours, removing the toe-nail, dividing tendons, operating for fistula, removing cancer of the lip, and other similar minor operations, which I need not mention. The process may also be applied to reduce local inflammation.

“In course of time, and guided by experience and the advancement of science, we may, however, expect more. If an anæsthetic fluid of

negative qualities, as regards irritation of nerve, and which has a boiling-point of 75° or 80° , can be obtained from the hydro-carbon series, the deepest anæsthesia may be produced, and even a limb may be amputated by this method. It may also turn out that certain anæsthetics may be added to the etherial solution with advantage, such as small quantities of chloroform, or some of the narcotic alkaloids, if they could be made soluble in ether. A solution of morphia and atropia combined, if they could be diffused through ether, which at present seems impossible, could thus be brought into action so as to cause deep insensibility. In operating on the extremities it would be good practice to stop the current of warm blood by making pressure above on the main artery.

“Reaction from the anæsthesia is in no degree painful, and hæmorrhage is almost entirely controlled during the anæsthesia.”

In the ‘*Med. Times and Gaz.*,’ 1865, i, p. 514, Mr. Campbell de Morgan describes a new form of fixed bandage for fractures, abridged from some papers by Dr. Hamon, in the ‘*Gaz. Méd. de Paris*,’ 1865.—The bandage or splint which Mr. De Morgan here describes resembles in some respects the plaster-of-Paris splint, *i. e.* it is formed of a bandage, or of strips of bandage, or of any linen or cotton material, applied evenly to the limb, and thickened with a fluid material, which coagulates spontaneously. Only, instead of plaster, a solution made of melted French glue, mixed with a fifth part of its bulk of alcohol (methylated or other spirit), is used. Two or three thicknesses having been applied, and left for not less than 12 nor more than 24 hours to stiffen, it is cut in halves, and each half furnished with eyelet-holes on either side, and then laced on. The advantage it possesses is its elasticity, combined with firmness—qualities which it retains undiminished for any length of time. It can be adapted to the varying conditions of a limb, as to swelling, &c. It is, moreover, very light, and yet strong enough for any purpose to which a splint can be applicable.

Endoscopy.—Desormeaux, ‘*Sur l’Endoscope*,’ Paris, 1865.—M. Desormeaux commences his pamphlet with a short reference to the attempts of previous surgeons to explore the urethra. M. Ségalas, Mr. Avery, and a surgeon named Hacken, of Riga, are named; but it does not appear, from M. Desormeaux’s account, that any practical result followed from their labours. He next gives a detailed description of the instrument which he employs. This description is of great practical utility for any one who is in possession of the instrument, but our space will hardly allow of our quoting it at any great length. The essential principle of the invention may be stated as follows:—A lamp placed in the vertical position has its light reflected by means of a mirror fixed at an angle of 45° down a tube, which can be turned to any angle in the vertical plane, but is generally used nearly horizontal. The mirror is pierced in the centre, and furnished at one end with an eyepiece. To the opposite end of the larger tube containing the mirror is fixed the small tube which passes down the urethra, or other cavity which is to be explored.

A few minor details are necessary to be known, as the success of the exploration depends on the perfect adjustment of the apparatus. In order to obtain a very small point of intense light, M. Desormeaux uses the flame of a small cotton-wick steeped in gazogene, which he has found to best combine the requisite conditions of a strong and concentrated light, without too large a flame or too much heat. To increase the light a concave reflector is adapted behind the flame, and a plano-convex lens in front (*i. e.* between the flame and the inclined mirror). The eyepiece is furnished with lenses to suit different sights, and between it and the mirror a conical pierced diaphragm is fixed, the hole in which is smaller than that of the mirror, so as to conceal the reflection from the edges of the latter. The urethral tube is first passed down to the required distance, and is then fixed in the mirror-tube by a catch. There is a slit at the side, down which instruments can be passed. The urethral tube terminates in an open end, which, however, is closed during its introduction by a bulbous stilet, introduced down the slit, and then withdrawn. The slit is also used to induce stilets holding cotton-wool, to wipe the surface which is to be examined, or carrying probe-heads, knife-blades, &c., for passing strictures or performing operations. In order to obtain complete illumination, it is necessary to have the focus of the gazogene flame opposite to the centre of the reflector and mirror. This can be ascertained by looking up the mirror-tube (while open) at the inverted image of the lamp. The patient is to be placed at the extremity of a firm table of convenient height, with his legs resting on supports, and the operator stands between them to examine the urethra. Before introducing the endoscope a general idea of the state of the canal is to be obtained by means of an ordinary sound or other instrument. A dark room is to be preferred, though not absolutely necessary. In order to examine, throughout its whole extent, a urethra in which no obstacle exists, the tube should be passed down to the entrance of the bladder, which can be judged of by the depth and by the resistance experienced. It is easier than would be imagined to penetrate into the bladder; but this is to be carefully avoided, on account of the urine, which would fill the tube. The tube is now to be adapted to the endoscope, and is to be slowly withdrawn, illuminating the urethra all the way. Mucus from the urethra and oil from the instrument require to be removed with the cotton-wool from time to time. If any of the cotton-wool should drop into the urethra it will be forced out by the first micturition, or if it is necessary to remove it (as when saturated with caustic) this can be done by a wire terminating in a screw end. If a stricture be detected the instrument should be pushed down till it meets with it, and the above exploration commenced from that point.

The normal appearances of the urethra are first described. The lacunæ and the ejaculatory ducts M. Desormeaux asserts to be invisible, being effaced by the distension of the instrument, nor is the verumontanum usually perceptible. The colour of the mucous membrane is of a pale pink, and it folds itself into longitudinal rugæ as the instrument is withdrawn. The precise position of these rugæ depends on the movement of the tube; but if they are decidedly absent in any part a

loss of elasticity from disease of that part of the urethra may be suspected.

The author next treats of the use of the endoscope in each of the affections of the urethra, excluding for the present its prostatic portion.

In acute gonorrhœa endoscopic examination is impossible at first, on account of the pain. The earliest time at which M. Desormeaux has succeeded in exploring the urethra was in eight days. The inflammation extended along the anterior half of the canal, where the mucous membrane was found to be intensely red, having lost its polished surface, and showing superficial ulceration. The disease spreads gradually backwards, but does not reach the prostatic portion till after six weeks or two months. The anterior part of the urethra becomes healthy again at this period, and frequently the prostatic and membranous portions also recover, while the disease becomes localized about the bulb, where the redness becomes deeper and the surface more rough, presenting numerous salient points. This is the transition stage to chronic blenorrhœa, or gleet, and commencing stricture.

Acute urethritis may also be due to injury, herpes, or catarrh. The first is set up by solid bodies (as bougies) or liquids injected. It is rarely as acute as in gonorrhœa, and the mucous membrane seldom loses its polished surface. It is further distinguished from the gonorrhœal inflammation by its tendency to spontaneous cure on the removal of the irritating cause. This simple traumatic affection is not to be confounded with the relapses after old gonorrhœa, which are due to the unnatural condition in which the mucous membrane has been left by the disease.

Acute herpes (especially in children and in men who have had no sexual connection) is sometimes accompanied by discharge from the urethra, which is probably due to patches of herpes on the mucous membrane, but the author has not had an opportunity of seeing them.

In catarrhal urethritis, also, M. Desormeaux does not seem to have had an opportunity for endoscopy. He says the disease is distinguished from gonorrhœa by the inverse progress of the inflammation, which proceeds from the neck of the bladder outwards. M. Desormeaux believes that endoscopy, though not so important in acute as in chronic urethritis, will yet enable us clearly to distinguish from each other the varieties of the affection, and to say why it is contagious in one case and not in another; why it sometimes disappears permanently, at others tends to recur, at others persists indefinitely without producing any lesions, and again in other cases leads inevitably to stricture.

Chronic urethritis is the next subject. The author divides this into blenorrhagic (or gonorrhœal) and herpetic. He first describes minutely the progress of gonorrhœa passing into gleet, to show that both the general symptoms and the examination by a bougie testify to the existence of obstruction, which, however, is not so great as to arrest the passage of instruments. All that is found is a slight resistance, pain, and a tendency to bleed. In order to discover these slight symptoms a bulbous sound must be used. So far the diagnosis between the gonorrhœal and the herpetic affection can hardly be established, though

M. Desormeaux does point out a few particulars in which, as he believes, trifling differences exist.

In gleet the consequence of gonorrhœa the mucous membrane, probably in or around the bulb, is found deepened in colour and roughened by granulations, so as to present somewhat the appearance of a mulberry, the granulations rarely attaining the size of a small hempseed. Figures are given of such a condition of the bulbous portion of the urethra contrasted with another healthy portion of the mucous membrane in the same patient. This affection M. Desormeaux calls granular urethritis, and compares it to granular metritis and granular conjunctivitis. The granular condition of the canal extends usually from 2—4 centimètres (say about an inch); sometimes it occupies the whole canal from the lower part of the spongy portion to the entrance of the bladder; but a distinctive feature is that it always occurs in a single tract, never in isolated patches separated by healthy mucous membrane.

With this M. Desormeaux contrasts the affection which he calls herpetic urethritis. He gives it this name from its similarity in appearance to herpes in other parts of the body (especially on the neck of the uterus), though he inclines to the belief that it is essentially an arthritic affection. The surface of the mucous membrane in the herpetic affection presents depressions instead of granulations, resembling the depressions on the skin of an orange, or on a thimble, instead of the granular appearance of a mulberry; they are of less extent than the granulations in blenorrhœa, they are often found in several places, and they disappear from one place to show themselves in a different part of the urethra at another examination.

Granular urethritis tends inevitably to produce stricture. It follows a chronic course, little affected by anything except sexual intercourse, which usually reproduces or aggravates the discharge. Herpetic urethritis is often liable to relapses from the influence of the seasons, or any cause which produces rheumatism. A case is given of gleet lasting 11 years, and followed by apparent stricture, which, however, was found to be due entirely to the presence of granulations, and disappeared on their being cured by the application of a solution of nitrate of silver.

Sometimes the granulations pass into a fungous condition, bleeding easily, and furnishing a more abundant and more purulent discharge, but on being repressed by caustic they resume their ordinary appearance.

The natural termination of granular urethritis is in a kind of spontaneous cure, this cure being, however, accompanied by a lesion analogous to the cicatrization of a wound. The first stage is one of low inflammation, with submucous exudation and some obstruction. If the granulations now disappear the patient may get well without any stricture, and this curable stage may last an indefinite time, as in the instance above given, 11 years. But after this the exuded matter undergoes a change, producing induration or callosities, and the inflammation invades the fibrous tissue, which contracts slowly. At this period, though granulations are still to be found, their cure does not involve the disappearance of the symptoms; the exuded matters become organized, and a kind of cicatrix is produced in the submucous

tissue. This is the second stage. The granulations now disappear, perhaps because the cicatrization obliterates their source of vascular supply, and the mucous membrane itself assumes the appearance of a cicatrix. This is the third stage, and thus the formation of stricture is complete. The time which this process occupies is very variable. A case is given where the symptoms were said to be due to a single attack of gonorrhœa, 47 years previously, and where the granulations were still present, and the malady had only arrived at the second of the three stages just described.

M. Desormeaux then proceeds to show the uses of the endoscope in the complications of gonorrhœa. Cystitis, recurring at intervals without obvious cause, is, he says, a common complication of gleet, and can be proved by the endoscope to depend on the presence of granulations in the bulb or prostatic urethra. The tendency can be cured by destroying the granulations in recent cases; but when the inflammation has become inveterate this may no longer suffice. Cystitis may also depend on the herpetic condition of the urethra, which can equally be diagnosed by endoscopy. In gonorrhœal arthritis endoscopy can be used to demonstrate its dependence on a granular condition of the urethra. The same may be said of granular conjunctivitis, which has so close a resemblance to granular urethritis, and which M. Desormeaux asserts (p. 60), on the authority of M. Thiry, to be capable of being produced by inoculation of the secretion from granular urethritis. He further says that M. Thiry has produced granulations on the neck of the uterus and in the urethra by inoculating on those parts the secretion from granular conjunctiva. Of gonorrhœal orchitis M. Desormeaux says that when it occurs, as it usually does, as the original malady is passing into the chronic stage, or during the stage of gleet, granulations can always be demonstrated in the bulbous, membranous, or prostatic urethra. Often the discharge is trifling and is not noticed, and then the orchitis may be taken to be tubercular, or traumatic, or epidemic. The endoscope will always establish the diagnosis and point out the treatment. The tubercular affection of the testicle resembles in a great many points the chronic gonorrhœal orchitis, and cannot always be distinguished from it without the endoscope.

The author then proceeds to argue that acute gonorrhœa can only be produced by specific inoculation from a similar case, and that granular urethritis in men and granular metritis in women may also prove infectious if the pus be present in appreciable quantity, producing usually a similar chronic disease, but sometimes acute gonorrhœa.

Having established the fact that true gonorrhœa is always specific, and that granular urethritis is always of the same nature, the author proceeds to argue against the ordinary treatment of gleet, such as irritating injections, the setting up of fresh inflammation, the recommendation of sexual intercourse. The cause of the chronic affection being the presence of granulations, it can only be cured by the cure of those granulations by local measures, *i. e.* by cauterization. This cannot be done efficiently by the ordinary methods. Caustic injections must be either too weak to act on the granulations or too strong to be

borne by the healthy parts of the membrane; the porte-caustique cannot be directed to the exact point required. But caustic can be easily applied in solution by means of the endoscope to the granulations, and in this condition it penetrates into all the recesses of the surface, without producing sloughing. M. Desormeaux uses from 1—3 parts of water to 1 part of nitrate of silver. The urethra at the part affected is first to be dried by the application of a piece of dry cotton, and then a piece of cotton steeped in the solution is pressed on it for a short time. The effect is to turn the part white and render the granulations more visible. It causes a little pain and some scalding in micturition. The cauterization should be repeated at first every 3 or 4 days, then once a week. If the granulations are fungous, the stronger solutions are necessary. Rigors and threatening of orchitis are rare complications, and easily managed. Slightly astringent injections and baths are useful adjuvants. No internal treatment is generally necessary. The patient should have a tonic but non-stimulant regimen, and sexual intercourse must be absolutely forbidden. This treatment M. Desormeaux says will cure every case, if persevered in; but it often requires a long time. It is a little difficult to know when the treatment may be suspended, for the discharge will, of course, continue while instruments and cauterizations are being constantly used. The appearance of the ulcerated part must be the guide. When the mucous membrane, though still red, has become smooth, and when the caustic only produces a pale colour and not a dull white layer, the cauterizations may be suspended. The injections must be continued a little longer, and then the discharge will cease by simple hygienic treatment.

In the herpetic affection the general treatment is of the first importance (alkaline and arsenical baths, alteratives, alkaline mineral waters, Fowler's solution, &c.). Cauterization generally aggravates the mischief. The patches may be touched with the huile de cade and astringent injections may be used; or, better, an injection made with 1 part of the huile de cade to 5 or 10 parts of oil of sweet almonds, or alkaline injections, or injections of the sulphurous mineral waters.

In some lymphatic constitutions there is a hypersecretion from the urethra, without any lesion. This state can be recognised by the endoscope, and requires tonic treatment, sea-bathing, &c.

The author now passes to the consideration of stricture, commencing with a general sketch of the progress of its formation. Between the original condition of inflammatory obstruction in acute gonorrhœa and the final state of fibroid cicatricial organic stricture there is an intermediate stage of indefinite duration, which can only be studied by endoscopic examination. The first stage is characterised merely by swelling, and redness of the mucous membrane. It passes away with the acute stage of the gonorrhœa, and requires no other treatment than what is directed to the latter. Sometimes gonorrhœa may develop stricture without having passed through the stage of granular urethritis. In this case either the inflammation acquires considerable intensity on certain points, marked externally by nodosities, which are tender to the touch, and the tissues become too profoundly altered to regain their natural consistence; or, "the urethra, having become inextensible,

forms what the vulgar call 'the cord,' and, in obedience to a very common prejudice, the patient forcibly ruptures this *cord*, that is to say, produces laceration of the urethra." In either case a cicatricial stricture is found, generally very resistant and retractile. This usually happens early, before the inflammation has passed as far back as the bulb, so that strictures of this kind are generally situated in the spongy portion, and this may explain the more intractable character which is usually attributed to stricture in the anterior part of the urethra.

The formation of chronic inflammatory stricture by the termination of granular urethritis has already been partly described. The stricture in its earlier period is formed of two elements, viz., the constriction of the walls, and the granulations. The former may be dilated by mechanical means, but so long as the latter are not cured the same process will recur. Hence the tendency to obstinate recurrence, after any amount of dilatation, observed in such strictures. If the granular ulceration be brought to heal the stricture can be permanently cured, when taken at a period anterior to the formation of organized cicatricial material in the submucous tissue. When this has taken place recurrence is the rule, and radical cure only a rare exception. When submucous exudation has occurred, but the cicatrix is not fully formed, mechanical dilatation is necessary. The details are given in p. 88 of a post-mortem examination in a case of old stricture, which had never been treated, to show the natural and usual composition of such a cicatricial stricture, and its exact analogy to other cicatrices. Such cicatrices, the author says, will always recontract at once after any amount of dilatation, and the patient is in a condition which is intolerable, from the constant necessity for instrumental treatment, and very dangerous from his being exposed constantly to risks of rigors, cystitis, inflammation of the urethra, &c. Urethrotomy is necessary in such cases, in order to substitute for the original cicatrix one less disposed to retraction. The next point is to show how the endoscope furnishes the means of recognising these various conditions and fulfilling their indications. (4th Lect., p. 92.)

M. Desormeaux first insists on this fact—that the endoscope is not meant to replace, nor to repeat, the indications furnished by the ordinary methods, *i. e.* those derived from the source of touch, and which furnish information more or less reliable as to the existence and seat of strictures, their number, their length, their calibre, their retractility, and their consistence; but to supplement these indications by others drawn from the sense of sight, which gives evidence as to the colour and the configuration of the face of the stricture, and, further, the exact position of its orifice. First, as to the colour. During the period of transition, from the period of ulceration and granulation to that of cicatrization, the mucous membrane loses its pink, or even red, tinge, and becomes pale, greyish, or even pearly, in hue; its rough surface also gives place to a smooth cicatricial tissue, which presents various forms of irregularity, of which illustrations are given (pl. i, figs 6—10). These various forms are classified in 3 groups—1, the funnel-shaped, which are the easiest to treat, but, unfortunately, also the rarest; 2, the mamillary, where there are one or several little pro-

jections, each circumscribed by a groove, in which, at some point or other, the opening of the urethra is to be found, but is not always easy to see; and 3, the diaphragmatic, in which there is a sort of irregular rough curtain across the urethra, marked with little furrows and irregularities, in one of which the orifice is to be found. The latter is often the most intractable form. Having exposed fully the face of the stricture at the end of the tube, some idea may be obtained of its consistence by pressing on it with a probe, introduced down the tube, and watching the resilience of the tissues. In this way the existence of cicatricial tissue may sometimes be demonstrated in a stricture which looks at first only granular. But the main point is to determine the exact position of the orifice. In order to do this the depressions which are made out on the face of the stricture must be examined with a stilet, or a fine probe, passed down the side slit in the tube. In this way it is usually possible, after a few patient trials, to make sure of the exact position of the orifice. There are, then, two indications—(1) to pass the obstacle; (2) to destroy the obstacle. The first indication can usually be fulfilled by means of the endoscope. The orifice having been discovered with the probe, if the latter will not pass, a small whalebone bougie may be substituted for it and passed well into the stricture: the tube is then to be withdrawn over it, and the instrument will then, perhaps, enter the bladder by a little manipulation, or, if not, can be left in position for some time, and thus dilate the stricture for another subsequent attempt. A case is related in which a patient affected with traumatic stricture had been under the hands of many eminent surgeons, none of whom could pass the catheter. One had attempted external urethrotomy (perineal section), but had failed to find the opening of the stricture. The patient had then come under M. Civiale's care, who tried for 28 days to get an instrument into the bladder, but in vain. M. Desormeaux was then called in. He discovered the orifice by means of the endoscope, on the second sitting, and the whalebone bougie was made to reach the bladder after the next attempt. After this the case was easily treated. Other cases of a somewhat similar nature are related, by which M. Desormeaux shows that the endoscope will often save the patient from the necessity for urethrotomy or perineal section. But there will remain a few cases in which the orifice cannot be discovered, and there are others in which the cicatricial tissue is so fully formed and so retractile that after every successful dilatation the contraction will quickly recur, and the patient leads a miserable life, from the necessary treatment and the frequent intercurrent complications. In such cases the obstacle must be destroyed by some cutting operation. Internal urethrotomy, as hitherto practised, whether from before backwards or from behind forwards, equally requires that the stricture should be passed. So does the operation of rupturing the stricture, of which M. Desormeaux does not approve in any case. With the endoscope, on the contrary, when the opening is found, the operation is very easy, and requires no guide. A fine knife is to be substituted for the probe. It terminates in a probe-shaped end of the same size as that of the stilet, and has a blade two thirds of an inch in length, the edge looking either upwards or downwards, as may be required. Its probe-

shaped end is passed into the opening. Its edge is turned towards the diseased tissue, *e.g.* upwards, if the orifice is at the lower part of the stricture. If there is no indication for incising one part of the urethra in preference to another, M. Desormeaux always directs his incision upwards. The knife is gently pressed onwards till the resistance ceases. In withdrawing it its edge should be pressed against the remains of the stricture. Then a medium-sized catheter is to be passed, and M. Desormeaux is in the habit of tying it into the bladder for 4 or 5 days, though he does not much insist on the necessity for this, and always withdraws it if painful or inconvenient to the patient. He has practised the operation in this way more than 20 times, and has had no bad symptoms after it except occasionally rigors in those patients who were subject to rigors after catheterism. These he has always found controlled by the administration of quinine. This operation can be effected by means of the endoscope without any previous treatment of the stricture. Its necessity can be determined also by endoscopic examination, and by its means M. Desormeaux believes that the necessity for puncture of the bladder or perineal section will be, if not entirely obviated, at least rendered exceedingly rare. The details of several cases of endoscopic urethrotomy are given, which, though extremely interesting and instructive, we must omit for want of space.

P. 142.—The next topic is the examination and treatment of fistula in perinæo. M. Desormeaux describes how the orifice of a fistula may be brought into view by the endoscope. He says the orifice is often difficult to see, as its borders are in contact, and it is situated in the middle of a patch of ulceration; but it may be recognised by its red or wine-lees colour, or frequently a sound can be passed into it from the perineal orifice. He gives a figure of the appearance of such a fistula, masked by a large vegetation in the urethra (pl. i, fig. 2).

In cases where the ordinary means fail to cure the affection a cure may often be effected by touching the urethral orifice of the fistula with nitrate of silver in substance, afterwards neutralized by a solution of common salt. An instrument for carrying the caustic is figured (p. 145), and the notes of a case are given in which a cure was effected by the method recommended.

Lect. v, p. 149.—The last lecture treats of the endoscopic examination of the prostate and bladder. In the prostatic urethra the granular and the herpetic affections offer the same characters as in other parts of the urethra, only that the granulations more easily become fungous, and are consequently more difficult of diagnosis. In this part of the urethra the granular affection does not terminate in stricture (which, indeed, is never found in the prostatic urethra), but in chronic engorgement of the gland. The reality of this connection of the chronic engorgement of the gland as effect, with the granular affection as cause, is shown by the disappearance of the former on the cure of the latter, which is as easily effected in this part of the urethra as in any other, and in the same way. Still, the engorgement, if of long standing, may persist after the cure of the granulations; and there are many other causes besides these granulations on which it may depend—as the herpetic or arthritic diathesis, scrofula, &c. Hence, great difficulty in the diagnosis of these

prostatic affections; but M. Desormeaux professes to be able to distinguish the engorgement due to granulations from the scrofulous engorgement with ulceration—the latter kind of ulceration penetrates through the mucous membrane to a variable distance, presenting a deep and rugged surface, like strumous ulcers in other parts. Sometimes (though by no means always) ulceration in this part causes spermatorrhœa, and this affection is curable by the removal of its cause. The author divides spermatorrhœa into two forms—one due to ulceration, accompanied by deep-seated pain in the perinæum, and sometimes with slight admixture of blood; the other atonic, in which the loss of semen occurs without any symptom whatever, often in sleep, or on the slightest excitement. Allusion is made to some cases of ulceration in the prostatic region, and to the symptoms depending on it. Again, the prostatic urethra may be affected with cancer, though this is usually only an insignificant part of a malignant affection of the bladder. To explore the prostatic urethra, the bladder must be full, and the urethra must be kept open. This is effected by a tube bent at an angle, with a short branch beyond the angle, and a glazed window in the bend. The bladder must be full of a liquid which is quite clear—so that the first step is to evacuate the urine, if mixed with mucus, blood, or pus, and to wash out the bladder with water till it no longer returns tinged. Then the endoscope may be mounted on the tube just described. In the natural condition of the bladder, about half its surface can be brought into sight, viz., from the border of the prostate over the trigone and base of the bladder up to its summit. At present M. Desormeaux's attempts to bring the anterior part of the organ into view have not succeeded. Fortunately, the portion which can be seen is that which almost always is the one affected.

The mucous surface of the healthy bladder appears generally smooth, without vessels large enough to be seen, and of a somewhat paler tint than that of the urethra, yellowish-white, with a pink tinge. Fine superficial vessels are sometimes seen. The transverse ridge which sometimes unites the orifices of the ureters can be distinguished when it exists, but not those orifices themselves. By withdrawing the tube until the mirror is beginning to enter the urethra, the border of the prostate comes into view, as a crescentic margin, concave upwards. The colour is more red than that of the bladder, and as its edge interrupts the rays of light the vesical surface is thrown more into the shade, and looks darker than before. By sweeping the instrument round, the circumference of the orifice of the bladder can be followed; but the traction of the instrument causes it to appear elliptical, instead of round.

The morbid conditions of the bladder which are visible to the endoscope are next described. In the first place, anæmia and congestion of the mucous membrane can be recognised, the latter sometimes accompanied by ecchymosis. Cases are referred to where symptoms which, at first sight, appeared grave, were traced to simple congestion of the vessels near the neck of the bladder, probably from the arthritic diathesis. Sometimes in cases of hæmaturia the vessels can be made out to be varicose.

In acute cystitis no advantage could be derived from endoscopic examination which would compensate for the pain and danger attending it; but in chronic cystitis the condition of the mucous membrane can be detected, and it will be seen to be dark red, vascular, rough, irregular, ragged, and smeared in parts with pus, according to circumstances. A case is given in which, besides the dark red of the congested mucous membrane, round red projections were seen (and are figured pl. ii, fig. 3) near the prostatic orifice, which were probably enlarged prostatic follicles. In engorgement of the prostate the projection of its border is more considerable; its edge, instead of being concave, becomes flat, or even convex, and instead of yielding gradually as the tube moves over it it opens and shuts like a cover. Sometimes, when abscesses have existed in the prostate, the cicatrization they have produced causes irregularity of its surface.

In tumours of the bladder, properly so called, M. Desormeaux had not had an opportunity of endoscopic examination, but two cases of cancerous degeneration of the bladder and prostate had been under his care, and he figures the malignant granulations found in the prostate and base of the bladder. M. Desormeaux believes that very valuable information can be obtained from the endoscope in cases of tumour of the bladder, as also in the diagnosis between tumour and columnar bladder.

Calculi can easily be seen in the bladder, and an idea can be obtained of their volume by counting the number of times which the field of the instrument is changed in passing over their surface. The surface almost always contains some salient points by which this comparison may be checked. In this way M. Desormeaux has made estimates of the size of stones, and these estimates have been found correct after extraction. The number also of stones present in a single bladder can be ascertained by the endoscope, as M. Desormeaux has assured himself by experiments on the dead subject, and of which he gives an example (the only one he had had the opportunity of trying) on the living. M. Desormeaux also notices that occasionally in a columnar bladder, where the rugæ are encrusted with salts, it is hardly possible to distinguish it from stone, and gives an instance which occurred to himself. In such cases endoscopy, he thinks, would clear up the doubt. In encysted calculus, also, the position and arrangement of the stone and the mucous membrane can be distinctly made out, of which M. Desormeaux gives two instances, where he was able to diagnose the encysted condition of the stone, and in one of which his diagnosis was confirmed by autopsy, the patient having died suddenly.

Note.—In offering to the reader this brief abstract of M. Desormeaux's most interesting volume, we have been obliged to omit a number of very important details, with respect to the method of conducting the examination and other points, on which in practice success in using the method will much depend. These, however, can only be effectually studied in the book itself. Our object here is only to call the attention of our readers to the alleged advantages of this new mode of investigation.

As a supplement to M. Desormeaux's general work on the endoscope, we may notice a pamphlet by him, entitled '*De l'Uréthrotomie: Discours prononcé à la Société de Chirurgie, Juin 5, 1865.*'* M. Desormeaux begins by observing that urethrotomy, when successful, does not usually preclude the necessity for maintaining the calibre of the urethra during the rest of life by dilatation; but in some rare cases this completely successful result is actually obtained. In this operation he now uses the endoscopic method (in the manner above described) almost exclusively, and he proceeds to give some details of the cases of which he has notes, 18 in number. He has had several more cases, but he had entrusted the notes of these to a gentleman whose sudden death caused the loss of the papers. The notes, however, which he presents in this pamphlet contain the only fatal case which has occurred, nor was there amongst those which are lost a single instance of serious complication. Amongst these 18 cases we remark one (No. 4) in which M. Desormeaux was obliged afterwards to have recourse to Syme's operation (external urethrotomy on a grooved staff); but as this case occurred some years ago, it is possible that enlarged experience would at present enable M. Desormeaux to have performed his operation with more success. In two others of the cases the operation had to be repeated (Nos. 1, 6), and in another (No. 7) the stricture was known to have recurred. In one case (No. 8) the patient had two strictures, both of which were treated successively by M. Desormeaux's method, and with success. In the fatal case (No. 15) the stricture was found by post-mortem examination to have been properly divided, and there was no lesion of neighbouring parts. The patient was only 17 years of age, suffering from a severe traumatic stricture. One of the abscesses in this case, however, was situated in the upper part of the thigh, and M. Desormeaux very candidly points out that there might have been some direct communication, not proved after death, between this abscess and the operation-wound. With equal candour he adds to the case of recurrence which stands in his notes two others, one of which was observed by M. Voillemier, and the other had come to his own knowledge since the compilation of the work before us. He notes that all these relapses were in traumatic cases, but he allows that there may have been more such relapses in other cases. The same thing will occur after all methods of treatment. 'Urethral fever' was noted in 4 cases, but was easily controllable in all of them.

Having thus communicated the results of his large experience, M. Desormeaux goes on to speak of the value of urethrotomy in general.

After the abstract which we have given above of M. Desormeaux's views, it will not be necessary for us to restate them. He points out that it is in cases where the stricture is cicatricial or fibroid that it is liable to constant and rapid recontraction after dilatation, and that the latter process is very difficult and lengthy. In such cases, he says, "if one is forced to employ one bougie for several days before passing the next number—if the resistance of the tissues gives the sensation of

* Extracted from the '*Gazette des Hôpitaux*,' July 15, 1865.

an indurated ring—if, above all, after having suspended the treatment for a few days, one is forced to recommence with smaller bougies than those which passed at the beginning—it must be admitted that the stricture is fibrous, and it should be incised. But this method of coming to a conclusion involves delays, which the endoscope may avoid, while the latter method of examination gives at the same time much more precise indications. For, on examining a fibrous stricture with this instrument, it is seen to be of a whitish colour, like fibrous or cicatricial tissue, often of a pearly white, and offering the appearance of a scar. Whenever this character is recognised under the endoscope incision ought to be resolved on, for dilatation will give no durable result."

He then shows at length the advantages of his method over the older operations. As to the extent of incision, he says that it should extend, if possible, through the whole of the diseased tissues, and no further. It is easy by means of the endoscope to judge of the proper direction and necessary extent of the incision.

It is especially in cases where the stricture cannot be penetrated by bougies that this method of urethrotomy is so much preferable to the others. The orifice having been discovered, the probe point of the urethrotome can be introduced, and the tissues which resist the passage of the instrument divided.

M. Desormeaux refers to 2 cases of endoscopic urethrotomy practised at St. Petersburg by Dr. Ebermann.

As to rigors after the operation, he divides them into three kinds:—
1. From nervous disorder, coming on immediately after the operation, and cured by the warmth of the bed and by warm drinks. 2. From urethral fever, coming on on the second or third day, often caused by the catheter tied in the bladder and disappearing when this is withdrawn, easily controllable by quinine. 3. From pyæmia, rare and never occurring till after a few days, when suppuration is established.

Hæmorrhage he has never seen, probably from the care taken to limit the incision to the cicatricial tissues.

Dr. Cruise of Dublin has published in the 'Dub. Quart. Journ.' for May, 1865, a paper on "The Utility of the Endoscope as an aid in the Diagnosis and Treatment of Disease."

Dr. Cruise commences by saying that he has been for a long time engaged in the practice of endoscopy, having apparently failed to bring it to a practical result before Desormeaux's pamphlet made its appearance, and resumed the study afterwards. It is not, however, quite clear, from Dr. Cruise's phraseology, whether he does not claim to have originated an apparatus of his own independently of Desormeaux. This personal question is of minor importance. Our interest is chiefly with the value which Dr. Cruise attributes to the instrument. He says, "By its aid the urethra can be seen and minutely examined from its orifice to the neck of the bladder, each single speck of disease ocularly demonstrated, and, if need be, subjected to precise local treatment. The utility of the endoscope is not, however, confined to the diagnosis and treatment of diseases of the urethra—far otherwise. There is no portion of the human body into which a straight tube can

be introduced in which it will not be found of service. With it the interior of the bladder may be thoroughly investigated; tumours, ulcerations, and calculi recognised; calculi examined, and information gained as to their size, figure, number, position, whether encysted or loose, and so on. The rectum, beyond the reach of the finger and speculum, can be searched for ulcerations, constrictions, tumours, &c. The cavity of the uterus can be demonstrated, so also the auditory meatus, nasal fossæ, pharynx, larynx, and, I should even hope, the œsophagus and stomach. Likewise wounds, especially those suspected to contain foreign bodies, abscesses, the cavities of ovarian cysts after tapping, and so on. I have been enabled by the endoscope to obtain so clear a view of the interior of the uterus that I am satisfied it will prove most useful for the diagnosis of small polypi, granular and follicular ulcerations, and other affections which at present are subjects of conjecture rather than positive knowledge."

Dr. Cruise then describes the instrument which he uses, and by which, as he contends, a much more powerful illumination is produced than by that of Desormeaux.

The applications of the instrument are then illustrated. The author agrees with M. Desormeaux in believing that "chronic granular urethritis is the pathological condition most commonly associated with gleet, and that it constitutes the transition stage between the acute inflammatory constriction produced by blenorhagia and its final issue in organic stricture." This condition is to be combated by the application of strong solutions of nitrate of silver or sulphate of copper (gr. xv—xxx : 3j) to the granular part, which is to be exposed by the endoscope, and will usually be found about the bulbous or prostatic portion. A case is related, illustrated with chromo-lithographic drawings.

The diagnosis of stricture by the endoscope is next discussed; and Dr. Cruise describes the usual appearance, under the instrument, of an organic constriction of the urethra, illustrated by a chromo-lithograph. With respect to the diagnosis Dr. Cruise says, "Nothing in medicine can be more certain than the diagnosis of organic stricture with the aid of the endoscope. . . . I am quite certain that any one who has once examined endoscopically an organic stricture of the urethra will acknowledge the impossibility of confounding it with a fold of mucous membrane, with a deviation in the canal, with the obstruction sometimes offered by the triangular ligament of the perinæum, or, in fact, with any other condition of the part."

A case is then related where the endoscopic examination of a stricture enabled the author to pass an instrument after trials in the ordinary way had been found to be unsuccessful.

An interesting account is given (p. 353) of the appearance of a stricture after its rupture by Holt's method; and then Dr. Cruise describes the method of performing internal urethrotomy with the endoscope, also the use of the instrument in examining and cauterizing the internal orifice of a fistula.

In the diagnosis and treatment of cases of spermatorrhœa the author has found the endoscope of great value. He divides cases of sperma-

torrhœa generally into *irritative*, where the mucous membrane about the orifices of the prostatic ducts is inflamed and ulcerated and the glands engorged, and in which local cauterization is highly serviceable; and *atonic*, in which the opposite of all this prevails. He figures an instrument, devised by himself, for the application of caustic in solution in these cases.

In diseases of the female urethra Dr. Cruise has also found the plan of use, of which he gives an example in p. 359.

Finally, he affirms that by means of the method which he follows, and the instruments which he describes and figures, the interior of the bladder may be accurately and satisfactorily inspected, and he gives the following convincing proof of the fact:—"Dr. McDonnell first prepared a subject by opening the bladder and introducing into it 3 substances of a nature the most unlikely to be thought of, and respecting which I was in total ignorance. He then brought me to the body, and challenged me to tell with my endoscope what the articles in the bladder were. In a few minutes I was able to do so, and to demonstrate them to him. The articles were a brass screw with a milled head, a short Minié bullet, and a mass of plaster of Paris."*

In the 'Dublin Quarterly Journal,' Feb. 1866, p. 83, there is the account, by Dr. Gordon, of a case of pleurisy in which, after suppuration had set in, causing extensive emphysema, he treated the case by the insertion of a drainage-tube through a puncture at the lowest practicable part of the left pleura, without making a counter-opening, as Dr. Goodfellow recommends. The case turned out well, though pleural fistula persisted. But our chief reason for quoting it is the following, which we give in Dr. Gordon's words:—"This case is very remarkable as being the first in which an examination of the interior of the chest has been made by the endoscope. The facts which we satisfied ourselves of were, that the lung was not compressed towards the spine nor much reduced in size; that is, that there was no large vacant pleural cavity, and that wherever we saw the pleura it presented more or less a granular surface, and no appearance of lymph. To ascertain the condition of a lung in a case where pleural fistula exists can never be a very easy matter. An endoscopic examination may in such cases, therefore, be most valuable; that it is perfectly practicable this case proves. I am indebted to Dr. Cruise for making the examination. It was the first occasion upon which he had used the binocular adjustment, which renders the instrument so much more perfect."

* We may quote the following from an author whose opinion will command respect:—"It is not saying too much to declare that for the diagnosis of diseases of the whole tract of the urethra, the bladder, the vagina, the uterus, the rectum, the nasal cavities, and pharynx, the endoscope may be placed on a level with the laryngoscope and ophthalmoscope in their special applications to diagnosis.

"The endoscope is further applicable in the case of wounds, especially in determining the presence or absence of a foreign body. Had Garibaldi been fortunate enough to have had Dr. Cruise on his medical staff at Aspromonte he would have been saved great suffering, and the cause of surgery some discredit. The endoscope is further applicable for exploring serous cavities after operation, as well as the lining membrane of cysts and abscesses."—From an Address by Dr. Stokes, published in the 'Medical Press and Circular,' Dec. 19, 1866.

In the 'Lancet' for 1866, ii, p. 348, Mr. T. P. Teale, jun., publishes a clinical lecture on the use of the endoscope in cases of stone in the bladder. Mr. Teale says, "I have examined the bladder in 6 cases where stone had been previously detected by the sound, and in all I was able to see the stone. I learned something in each. Had I the cases to observe now I am convinced that I should learn much more, and that in one of them I could have obtained information which would have led me to adopt a course of treatment different from that which was carried out." We append 3 of the cases referred to.

"Wm. H—, æt. 52, had suffered from symptoms of stone for several years. The bladder was irritable, so that I did not carry out the rule laid down by Dr. Cruise, to distend it with water. The result was that, although I saw the surface of the stone, and traversed a considerable portion of it, yet, from my inability to move the instrument freely within the bladder, I was unable to explore the entire surface. Lithotritry was first employed, but the irritability of the bladder did not subside, and lithotomy became necessary. It was found that there was a second stone, which had never been crushed. . . . I have no doubt that a more skilful use of the endoscope would have enabled me to see that there were two rather large calculi, and would have led me to adopt lithotomy instead of lithotritry."

"S. C—, æt. 71, was the subject of stone. I examined him with the endoscope in the hope of obtaining evidence which might guide me in deciding between lithotomy and lithotritry. I detected, not one stone only, but several small, white, round calculi, some of which appeared to have been spontaneously broken into fragments. I had therefore no hesitation in deciding upon lithotritry. A few hours before the first operation he passed some small fragments of round calculi, thus proving the correctness of the endoscopic observation. The operation still further confirmed the diagnosis, as none but small calculi were found by the lithotrite."

"I was requested by Dr. Clifford Allbutt to examine John T—, whom he suspected to be suffering from stone in the bladder. Having first, with difficulty, detected a stone with the sound, I injected the bladder, and introduced the endoscope. We then saw several small calculi lying just within the neck of the bladder, varying in size from a large pea to a hemp-seed. I then introduced a catheter with a large eye, and by means of Mr. Clover's syringe removed *ten* small calculi exactly corresponding with those we had seen."

Mr. Christopher Heath has also recorded a portion of his experience of the endoscope, in a pamphlet entitled 'On the Endoscope as a means for the Diagnosis and Treatment of Urethral Disease' (Churchill, 1866). Mr. Heath mentions that he has also used the instrument satisfactorily in the bladder and rectum. After describing the instrument, and the appearance of the healthy urethra as seen through it, which he compares to that of a healthy rectum on a smaller scale, or to a vagina, but with the folds of mucous membrane longitudinal instead of transverse, Mr. Heath proceeds to state that he has observed in healthy urethras a constant vermicular contraction of the wall of the canal, apparently passing towards the bladder. This accounts for the tendency of foreign

bodies in the urethra to pass to the bladder, and is wanting when the tissues are indurated. "The mode in which an indurated and strictured (even though very slightly so) portion of the urethra closes down abruptly on the end of the tube as it is withdrawn is very characteristic, and contrasts strongly with the gradual closure of the healthy canal." The application of a solution of nitrate of silver to its actual seat is one of the most useful methods of treating the disease revealed by the endoscope. Mr. Heath always uses it of the strength of 20 grains to a drachm of water. It excites no disturbance when applied to the diseased surfaces, and ordinarily gives nothing more than a momentary smarting pain. It increases the discharge for a day or two. "The use of injections and of internal remedies must be had recourse to as well, however, in order to effect a cure, in the majority of cases."

Mr. Heath proceeds to illustrate by cases and by drawings the appearances seen, and the method of treatment adopted, in cases of granular urethritis and organic stricture. The urethra in the former condition is, as he says, perfectly different in appearance from that in organic stricture, although he believes, with Desormeaux, that the former may lead to the latter state. The granulations are frequently removed, and the calibre of the urethra restored, by a few applications of the solution of nitrate of silver. Organic stricture, Mr. Heath says, may be most certainly and readily diagnosed by means of the endoscope. If the contraction be too great to allow the tube to pass, it will bring the face of the stricture into view, when the canal will be seen to be contracted in various ways, so as to present a ring, perhaps not in the centre of the canal, or a slit, which may have different directions. Should the stricture be so slight as to allow the tube to pass, the abrupt closure of the strictured portion above alluded to will serve for diagnosis. In cases of organic stricture, impermeable to ordinary methods of treatment, Mr. Heath has succeeded by means of the endoscope in introducing a fine wire, and then, having removed the tube, has passed an elastic catheter over the wire into the bladder. He has not, however, as yet had an opportunity of thus relieving retention.

The diagnosis and treatment of urethral fistulæ and urethral chancre would, in Mr. Heath's opinion, be doubtless greatly facilitated by the endoscope, but on this head he has as yet no experience. Mr. Heath's paper terminates with the relation of 7 cases, 6 of granular urethritis and the other of organic stricture. All the cases of granular urethritis except one are reported cured. In the case of organic stricture the stricture was split with Holt's dilator, and No. 10 catheter could be passed, but the cure was not complete at the date of the report.

In the 'Indian Annals of Medical Science,' for June, 1865, Dr. Duka, of Bengal, gives a clear though succinct account of M. Desormeaux's method, and of the theory of urethritis which that author advocates. Dr. Duka distinguishes plainly between granular urethritis the result of gonorrhœa and herpetic urethritis. "In *granular* urethritis we notice a condition almost without an exception, viz. that there is no interruption in the diseased surface, it is *continuous* whatever its extent may be; but such is not the case in *herpetic* urethritis, where

healthy patches of mucous membrane between diseased ones are discernible. There is another very remarkable difference between these two affections, viz. gonorrhœal granulations appear like so many prominences, not unlike the surface of a ripe strawberry; those caused by herpes have depressions and sinuosities, of which the outer surface of an orange-peel gives a good similitude.

This author is not disposed to attribute the high importance to the endoscope in the diagnosis of diseases of the bladder which Dr. Cruise claims for it, and he speaks very cautiously as to the possibility of distinguishing by its means the morbid conditions which lead to spermatorrhœa; but he fully recognises its utility in the diagnosis and treatment of chronic urethritis and stricture.

Mr. Campbell de Morgan, in a paper entitled "On the use of the Chloride of Zinc in Surgical Operations and Injuries, and especially in Operations for the removal of Cancerous Tumours," in the 'British and Foreign Med.-Chir. Rev.,' Jan. 1866, refers in the first place to the views which have been impressed on the minds of surgeons who have studied cancer in the cancer-wards of the Middlesex Hospital, and which have been put forward by Mr. Moore in the pamphlet, of which a summary is presented on a subsequent page. These point to the local nature of cancer at its origin; and the discovery by Schroeder van der Kolk of the germs of the disease scattered amongst the tissues, far beyond the limits of the tumour, renders it probable that in many cases the recurrence of the disease is due to some of these invisible germs having been left behind. In other cases such germs may have been scattered about in the neighbourhood of the operation-wound, by the knife having (as it often does) accidentally divided the morbid structure. Such germs may be disseminated in the fat around the tumour, and so cause multiple recurrence near the seat of operation, or may be taken up by the veins and lymphatics, causing the recurrence of nodules of cancer in the course of the circulation. Examples of both phenomena are given; and others are adduced to show the probability, at any rate, that cancer is frequently at first local, and if so, then eradicable, provided always that the disease, including the germs scattered about in the neighbourhood of the tumour, can be eradicated. This idea would lead surgeons, in the first place, to operate at the earliest possible moment, and further, to endeavour to destroy the germs presumed to be scattered around the visible tumour. Mr. De Morgan relates a case where Mr. Moore applied the solid chloride of zinc in removing a cancer of the breast and axillary glands, with this view. The observation of the favorable progress of this case led the author to steep the wound of an amputation of the breast for cancer in a solution of the chloride (20 gr. to the ounce). The wound healed without any extraordinary pain, without sloughing, and with a remarkable absence of animal odour, in 48 hours, except at the point where the ligatures emerged; and this part healed as soon as the ligatures came away. Struck by the extraordinarily successful issue of this case, Mr. De Morgan began to apply the solution in a stronger form (as high as 40 gr. to the ounce) in similar operations, viz. for cancers; and then, on observing its good

effects on the healing of the wound, he has come to use it in all operations. A solution of chloride of zinc, from 30 to 40 gr. to an ounce of distilled water, is to be taken up with a piece of sponge, and worked into every part of the wound. "The first effect is always an excitement of the small vessels, and a general oozing of blood from surfaces which had been previously dry. The blood becomes pink and creamy by contact with the chloride. On further application of the solution the whole surface is softened, and assumes the same pink colour. The blood will continue to ooze out as long as the solution is applied, and for a short time after. Every part should be well saturated with the chloride—the edges of the skin, the adipose tissue, the spaces between the muscles, the medullary cavity, or cancellated structure of bone. The surgeon need not hesitate to apply it even to thin and delicate structures. I have been surprised, in many instances, at the very momentary character of the pain caused by the application of the lotion, and at its entire absence, even, in some cases, although no chloroform was used. Under any circumstances the pain is very transient, and I believe one may put down half an hour as its general period of duration." Mr. De Morgan says, however, that when applied to parts previously inflamed, or phagedænic, the pain is often severe and lasting. "The objection [that it prevents union by first intention] is not valid. A wound will heal entirely in 24 hours when the solution has been freely used. It may do so in less time, possibly, but I have often seen a wound entirely healed in that time. And, as a rule, I have found that wounds have healed more rapidly since I have used the application. After the experience I have had of its effects I should have no hesitation in using it in a plastic operation."

As a personal proof of the slight amount of irritation which the solution causes, Mr. De Morgan relates that he accidentally received a jet of it in his eye one day without experiencing any bad results, and that the same accident occurred to his dresser, and proved equally harmless. He relates that Mr. Moore injected a hydrocele with 3 oz. of water containing a drachm of the chloride, leaving half the fluid in the sac, and that he himself, in a case of Cæsarean section, sponged the inner surface and cut edges of the uterus and the peritoneum with the fluid. The patient died 41 hours after the operation, "but she had no pain, and the only spot where any marked inflammation was found after death was about one of the round ligaments, which had not been exposed to the action of the lotion."

The advantages claimed for this method are thus expressed:—"That decomposition does usually occur [that is, in operation-wounds] is evidenced by the peculiar sickly animal smell which is perceived whenever a wound which has been covered for a few hours is opened. When, on the contrary, a wound has been fairly impregnated with the chloride lotion, there is invariably an absence of any animal smell whatever for 2 or 3 days; and unless some diseased tissue remain in the wound, there will probably be none throughout the whole period of healing. Were this the only advantage, it would be a great one; I believe that in our hospital it has saved many a patient from erysipelas and pyæmia; certainly, we have been for the last 10 months entirely free from these

diseases after operations in which the lotion has been used, while just before they were very prevalent. . . . In many cases the wounds have healed in 24 hours, without the least fulness or swelling, and have left a line of cicatrix, which after a short time could hardly be seen or felt."

Mr. Lister has circulated the following 'Notice of a New Method of treating Compound Fractures.'—"The disastrous effects of compound fractures, as compared with the freedom from all danger in simple fractures, evidently depends essentially upon the fact that in the former the blood effused around the fragments, being in communication with the external air through a wound, undergoes decomposition, and, becoming an acrid irritant, produces more or less extensive death of tissue and suppuration, whereas in the latter the blood, retaining its natural bland character, is converted into tissue or got rid of by absorption. With regard to the mode in which the atmosphere produces decomposition of the blood, we now know, thanks to the beautiful researches of Pasteur, that the active agents are not the gaseous elements of the air, but minute living organisms suspended in it, which, by developing in a decomposable substance, determine a change in its chemical arrangement analogous to the fermentation of sugar under the influence of the yeast-plant. Hence it occurred to me that if in a compound fracture, before decomposition of the blood has set in, a material were applied to the wound which, though it might allow the gases of the atmosphere to penetrate it, would destroy its living germs, all evil consequences might be averted. For this purpose I selected carbolic acid, having heard of its remarkable efficacy in disinfecting sewage, and about a year and a half ago, a case of compound fracture of the leg presenting itself, with a wound too large to afford hope of union by first intention, I applied to it lint dipped in the acid, and found my anticipations fully realised; the case progressing exactly like a simple fracture, as regards absence of suppuration and of constitutional disturbance, and rapidity of osseous union of the fragments. I have since subjected to the same treatment 5 other cases, some of them as bad as any surgeon would think of saving, and the result has been better than I at first ventured to hope. The carbolic acid forms with the effused blood a dense crust which, if touched daily with the acid to ensure freedom from decomposition, may remain for weeks without a drop of pus forming beneath it, thus affording abundant time for absorption and organization of the effused blood."

The following selections refer to questions of operative surgery:

In the 'New York Medical Journal,' May, 1866, p. 142, will be found a *résumé* of all the cases of excision of the scapula which the reporter could find published. The paper is founded on a case by Dr. Hammer, of St. Louis, which that gentleman published in the 'St. Louis Medical Reporter,' March, 1866.

The report may be summed up as follows:

1. Five cases are alluded to in which the scapula was torn from the body along with the arm, and the patients recovered.

2. Eight cases are referred to in which the scapula was removed after amputation at the shoulder-joint. In all these cases where the event is given it was favorable.
3. Ten cases conclude the paper in which the scapula was removed without the arm. They belong to the following surgeons:—Dr. Gross, Langenbeck, Heyfelder, Syme, Jones of Jersey, Dr. Hammer, Syme, Fergusson, Pollock, Dr. Hamilton. The third and fourth cases died. The last was unfinished at the date of the report, as was also the ninth, in which, however, recovery afterwards took place.* The operation, however, being performed frequently for malignant disease, was in many cases followed by relapse. This was the result in the 2nd, 6th, and 9th cases.* The 1st case died from an accidental cause a short time after the operation. The 8th and 10th were too recent to allow of any report on this head. Complete and permanent recovery appears to have taken place in Mr. Jones's case, where the operation was performed on account of necrosis, the patient being in good health 6 years afterwards. In Mr. Syme's 2nd case, also, the patient was well 15 months after the operation. In Sir W. Fergusson's and Mr. Pollock's cases the acromion process of the scapula was divided and left behind. This forms with the clavicle a cup for the head of the humerus, and lessens the resulting deformity.

Excision of the Spleen ('Path. Soc. Trans.,' xvii, 294).—Mr. Spencer Wells exhibited to the Pathological Society of London, on Nov. 21, 1865, the spleen which he had removed the previous day, from a woman æt. 34, who had been suffering from a swelling in the abdomen for about half a year, and from some debility for about twice that time. She had had 3 children, and had been very weak after each confinement, but had never had any serious disease. The nature of the tumour was easily diagnosed as an enlarged spleen. The patient was placed on bromide of potassium and quinine, but the spleen continued to increase in size rapidly, the patient's condition became worse daily, and Dr. Jenner, who was called in, held out no hope of relief from medical treatment. It may be noticed that, though she was pale and anæmic, there was no considerable excess of white corpuscles in the blood. The operation to remove the spleen was performed as follows:—An incision was made along the outer border of the left rectus abdominis muscle, extending 5 inches above and 2 below the umbilicus, In opening the peritoneum a rather large artery was cut across in a piece of omentum, which was loosely adherent between the spleen and the abdominal wall. This was tied. The hand was passed below the spleen, and by turning the lower end out of the incision the whole was readily delivered. Mr. Wells was beginning to twist the spleen round, in order to bring the vessels into a sort of cord, preparatory to applying the ligature, when the splenic vein gave way, and blood ran freely from the spleen, but none entered the abdomen. The pedicle was secured

* These particulars with respect to Mr. Pollock's case are given from the personal knowledge of the present compiler, who assisted at it.

by a clamp temporarily while the ligatures were being applied, and on taking off the clamp it was found that the pancreas had been bruised by it. All the ligatures, except those on the vessels in the abdominal wall, were cut off close, and returned into the belly. The wound in the abdomen was closed with 8 silk sutures. The patient died on the 7th day. It is not necessary to quote the detailed notes of the case. It will be sufficient to say that, beyond the great shock of the operation, the prominent symptoms were rigors repeated frequently during the last 4 days of her life. On post-mortem examination the wound was found perfectly united, but the cutaneous edges were separated without difficulty. The peritoneal edges adhered much more firmly. Two ligatures on superficial vessels came away with a slight pull. There was a drop or two of pus in the track of one of them. The ligatures on the splenic vessels were found with difficulty, being hidden by the pancreas. There were no signs of general peritonitis, scarcely any serum and not a trace of blood being found in the abdomen. Redness and effusion of lymph were entirely limited to the seat of operation. Both pleuræ and the pericardium contained a large amount of bloody serum; the lungs were healthy, as were all the other viscera. The heart was flabby, and the blood in the body uncoagulated and decomposed. From this account it appears doubtful whether death was due to shock or to blood poisoning.

Mr. Wells says that, with the exception of two operations performed on the Continent (and both also fatal), this is the first instance in which the spleen has ever been excised in the human subject.

In the 'Guy's Hospital Reports,' 1866, p. 446, Mr. Bryant relates a case in which he performed this operation at Guy's Hospital, on June 20, 1866. The patient only survived about 3 hours. He was a young man æt. 20, who had suffered for about half a year from gradual enlargement of the spleen in leucocythæmia. The tumour filled nearly (but not quite) the whole of the left side of the abdomen. The details of the case need not be given. It is sufficient to say that Dr. Wilks, under whose care he was, believed that death was imminent, and that no medical treatment would give relief. The operation seems to have been easy, the tumour being readily extracted through an incision 5 inches in length, passing vertically from the cartilage of the 8th rib to the anterior superior spine of the ilium. The pedicle was secured by a whipcord ligature, which was cut short off and returned into the abdomen. The cause of death in this case was hæmorrhage into the abdominal cavity, proceeding, as it seemed, not from the pedicle, but from some smaller vessel lacerated in an adhesion which had to be separated to remove the tumour. Mr. Bryant expresses himself as quite satisfied of the justifiability of the operation in general, and would be prepared to repeat it in an appropriate case. The fatal result, in this instance, shows to his mind the importance of securing all vessels in accidental adhesions which the operator may have to deal with.

Œsophagotomy for pressure on the œsophagus, supposed to be from disease of the thyroid. Successful. Death afterwards, in consequence of tracheotomy, rendered necessary by commencing œdema glottidis.

Inflammation, ulceration, and gangrene of the œsophagus, found after death, with a peculiar divided condition of the tube, below the seat of obstruction. ('Deutsche Klinik,' 1865, Nos. 4, 5, 8, 9. By Prof. Bruns.) The following, though an isolated case, is so important that we give a short abstract. The patient, a man æt. 37 years, was operated on for œsophagotomy on Nov. 5, 1864. He had suffered from dysphagia for about a year. No cause was known, nor could any be discovered by examination, except a thickening of the left lobe of the thyroid, which was thought to compress the œsophagus. The tube was absolutely impervious to instruments, which were arrested at the level of the cricoid cartilage, but the patient could swallow a little fluid, though with great difficulty, and so slowly that, as the reporter, Dr. Schmidt (who had charge of the case, as resident medical officer), says, though he was all day attempting to swallow, he was always hungry, and was gradually sinking. There was no sign nor symptom of cancer of the œsophagus. The breathing was rather difficult, and laryngoscopy showed the glottis to be narrowed, and the vocal cords less freely movable than natural.

The operation consisted in dissecting down to the œsophagus (or pharynx) on the left side, at the level of the obstruction. Then a silver catheter was passed from the mouth, and the canal opened upon it. Still it was impossible to pass the catheter through the obstruction into the stomach. But after dissecting and tearing the thyroid body away from the œsophagus, it was found possible to pass a small œsophagus-tube, having a cavity of 3 millimètres, from the wound into the stomach. This was left in the wound, and the patient was fed through it with as much liquid as he chose to take. [It was noticed that the presence of this tube, whether its end lay in the stomach or œsophagus, caused a great increase in the secretion of saliva.] On the 3rd day it was necessary to change the tube, and a thicker one was substituted. On the 9th day one a centimètre (about one third of an inch) in diameter could be passed. This was changed daily, and on the 15th day after the operation a silver and then an elastic tube was passed through to the mouth, guided by the laryngoscope. On the next evening an œsophagus-tube 1 centimètre thick was passed from the mouth into the stomach, and left in. This tube, remaining in the mouth, gave him much inconvenience—salivation, hindrance of speech, snoring in respiration and sleep, rotting of the tube, &c.; and on the 21st day pieces of ivory, fastened to a string and passed into the strictured part by means of a pair of œsophagus-forceps, were employed to dilate the stricture. These were withdrawn to nourish the patient, who now began to swallow by his own efforts. The wound was almost healed. Everything seemed now going on well, except that the temperature kept above the normal standard, with exacerbations every 4 days. On Dec. 3 (28th day), after a thicker ivory plug had been thrust through the strictured part, it was found, after withdrawing it, in order to allow the patient to take nourishment, that it was impossible to reintroduce it. A small tube was with difficulty passed, and the attempts caused much dyspœa. Soon it became impossible to pass anything. Laryngoscopy showed œdema of the aryteno-epiglottidean folds, soon running into suppuration, and

the patient sunk into a semi-comatose state. Finally, on Dec. 7, tracheotomy was performed. The patient had been without an instrument in the œsophagus for three days. At the tracheotomy it was noticed that pus was coughed up from the lower part of the trachea, which was believed to come from an abscess situated posteriorly, having been burst by the tracheal tube. Milk taken by the mouth flowed out of the tracheal tube when the latter had an upper opening towards the larynx, but not when a tube was put in without such opening. This was held to depend on paralysis of the muscles of the glottis. Dyspnoea increased, with symptoms of commencing pneumonia; he became more and more comatose, and died on Dec. 9. The day before his death a renewed attempt to pass a tube into the stomach succeeded without any difficulty. He had been nourished with milk since the operation, and some of this could be traced in the expectoration; but at the post-mortem examination none was found in the lungs or main bronchi. The only visceral disease was pneumonia in the lower lobe of the right lung. The dissection of the neck did not prove exactly what was expected. The thyroid body did not show the enlargement perceived during life. The cervical glands were enlarged, the cellular tissue around the œsophagus infiltrated, and the œsophagus closely united to the spine. The trachea was narrowed, and showed a diphtheritic patch just below the tracheotomy wound. The larynx was also constricted, apparently by inflammatory thickness of its posterior wall, but there was no abscess or communication with the œsophagus. The walls of the œsophagus, for more than an inch in its whole circumference, just below its commencement, were gangrenous; and below this gangrenous part the œsophagus was divided by a pendulous septum into two canals. This septum was covered with epithelium on its posterior surface (that turned towards the œsophagus) and not on its anterior (that turned to the trachea). The canal in front—that lying next the trachea—ended in a blind extremity above. The lower end of the septum hung freely into the œsophagus. The blind extremity of the anterior pouch was below the gangrenous part of the œsophagus. At the upper end of this gangrenous part was the depression which remained from the wound of the operation.

These anatomical appearances are difficult of explanation. The gangrenous ulceration of the œsophagus might, as Dr. Schmidt observes, be produced by the pressure of the ivory plugs, though he is hardly prepared to admit that this pressure was sufficiently prolonged to produce such an effect; but the condition of the œsophagus is hard to be explained. At first sight it looks like the description of a false passage; but this is impossible, since a false passage could not produce a pouch terminating at its upper part in a blind extremity, and this situated an inch below the wound of the operation. Nor is it like any known congenital malformation. On the whole, the dissection rather obscures than elucidates the pathology of the case.

Amputation at the knee-joint. (From the "Circular No. 6," issued from the Surgeon-General's Office at Washington, 1865, p. 47).—This operation has found numerous advocates during the war, and has been

frequently performed. The returns to October, 1864, give 132 cases, of which 52 recovered and 64 died. In 6 cases amputation of the thigh was subsequently performed, with 3 recoveries and 3 deaths. In 10 cases the result is undetermined. These figures are encouraging; and if we look at the primary operations alone, the result is still more gratifying. Of 49 cases of primary amputation at the knee-joint, 31 recovered and 16 died, while 2 underwent reamputation, of whom 1 recovered and 1, a tuberculous subject, died. This gives a percentage of mortality in primary amputations at the knee-joint of 34·9. The mortality in primary amputation at the lower third of the thigh is much larger than this; indeed, it has been already indisputably proved by the Crimean statistics and by M. Malgaigne that the mortality in amputation augments in exact proportion as the incisions approach the trunk.

At the Army Medical Museum there is a photograph, accompanying specimen 2778, of the fine, well-rounded stump of Private Nevelling. . . . The objection to amputations at the knee-joint, that the resulting stump is ill-adapted to the use of an artificial limb, is set at rest by the results obtained by Hudson and other manufacturers, who distinctly declare that the stumps from the operation at the knee-joint give a base of support far better than any possibly to be gained in thigh-stumps. It is probable that the more extended experience of the late war will lead surgeons to share the convictions of Macleod, Baudens, and Malgaigne, that this operation is altogether preferable to the amputation at the lower third of the thigh.

Reference may be made on this subject also to Mazanowski, in 'Langenbeck's Archiv,' 1865, vii, p. 489, and Zeis, *ibid.*, p. 764; but our space does not allow of our abstracting their papers. Their experience of the operation is hardly so favorable as that of the American surgeons.*

On amputation of the leg, by a long rectangular flap from the calf. By Henry Lee, Surgeon to St. George's Hospital. ('Med.-Chir. Trans.,' xlviii, p. 195).—Mr. Lee recommends the amputation of the leg by a long and short rectangular flap, as in Mr. Teale's method, only that he forms his long flap from the back of the leg instead of the front, as Mr. Teale proposes, including in the flap only the superficial layer of muscles, and leaving the deep muscles with the vessels to be divided as high up as possible near the section of the bones. In this operation Mr. Lee says that "the long flap thus formed is much thicker than when taken from the front. It is consequently much less liable to slough. It affords a much more efficient protection to the ends of the bones, and a thicker and softer pad upon which to rest a part of the weight of the body when an artificial leg is applied.

Mr. Lee appends short notes of 5 cases in which he has performed the operation, 1 of which proved fatal. In the others the condition of the stump after recovery illustrated the advantages of the method.

* While these sheets are passing through the press we notice an interesting paper on this subject by Mr. Longmore ('Brit. Med. Journal,' Jan. 5, 1867).

In the 'Annali Universali di Medicina' for 1866, vol. cxcv, p. 423, is an extract from a pamphlet published at Florence in 1865, by Dr. Corradi, and having reference to an operation successfully performed for the removal of a parasitic formation in the perinæum. The mother was a primipara, 22 years of age, well formed, and of good constitution; the presentation natural. The infant, a female, was in other respects perfectly natural, and the umbilical cord was inserted in the usual way. But the child had three lower extremities. The accidental limb was situated between the two natural thighs, and looked at first like a long, thick, tortuous tail, but it terminated in a natural foot, with five toes, some of them provided with nails. The direction of the superfluous foot was the reverse of the natural—it was in a condition of forced extension, as in talipes equinus—the dorsum turned to the left and somewhat forwards, the sole in the opposite direction. The conformation of the foot resembled that of a left foot. In the erect position the thin edge of the foot, which was at its lowest part, came within six centimètres of the ground, and the leg was as well developed and as large as the others. There were two large warts on its outer side. The upper portion of the accidental limb was covered by a species of sleeve of skin, to the presence of which Dr. Corradi calls especial attention. At the base of this "sleeve," just in front of it, and a little to the left, was the anal aperture. The edge of this sleeve was formed by two strata of skin, the outer of which passed below the inner and terminated in fringes. This outer layer was evidently a continuation of the skin of the sacral, perineal, and inner gluteal regions. In a word, it was the skin of the region behind the anus turned outwards by the passage of the accidental formation. The superfluous limb was movable in all directions, and had no close connection either with the sacrum or with any point of the bony pelvis; it passed out, as it were, from the pelvic cavity between the rectum, which lay in front of it, the sacrum behind, and the ischia on either side. Examination from the rectum showed that it passed about two centimètres (two thirds of an inch circ.) above the anus, and there terminated in a bony prominence, beyond which no projection could be felt inside the pelvis. Except nutrition, the accidental limb did not seem to enjoy any function. It was as warm as other parts, but had no power of motion, voluntary or reflex, nor any sensibility.

The limb was removed at the age of one month. The portion of the skin of "the sleeve" which corresponded to the anal aperture was used to form a flap, by means of a curved incision, having its centre at the anus, and a radius of about an inch. This flap was dissected without finding any vessel to tie. The rectum was thus exposed and pressed out of the way with the index finger, while an assistant dragged the limb inwards and outwards, and by little touches of the knife a very compact and resisting cellulo-adipose tissue was divided until the limb was separated from the rectum for two centimètres. In doing this two large arteries going to the limb were cut and tied. Then the other aspect of the limb was similarly dissected out, with the ligature of a single vessel, and the flesh adjusted by the twisted suture. Everything went on well. The child at the last report was thriving and well at the age of

nine months, and the cicatrix had formed a sulcus lying symmetrically between the buttocks.

Dr. Senftleben ('Deutsche Klinik,' 1865, No. 18, p. 174) describes a case of congenital coccygeal tumour, which he removed successfully at the age of twelve days. The subject was a male infant, and had several healthy sisters. The tumour was about the size and shape of an apple, situated between the anus and coccyx, immovable, separated from the fold of the nates by a depression, giving on palpation the feeling of a lipoma with several harder portions, and showing on its apex a hard, about half the normal size. From the rectum a stalk could be felt running towards the sacrum. The tumour was surrounded by a circular incision, and the stalk running down to the sacrum was dissected to its attachment on the front of that bone. In doing this the peritoneal cavity was opened, and a piece of small intestine projected. This was returned, the stalk tied with a double ligature, and the tumour cut off. All went well, and the child was seen in excellent health at the age of nine months. On section the tumour was found to be composed of fat and portions of cartilage. The skeleton of the hand was cartilaginous.

Dr. Senftleben remarks on the risk of opening the peritoneum which there always is in these cases when the tumour is inserted on the front of the coccyx. He refers to a tumour of a similar nature containing cysts, under Professor Langenbeck's care, which he had the opportunity of dissecting, the child having died of erysipelas after puncture of one of the cysts. Here also the attachment was to the front of the sacrum. Sometimes, however, as he says, processes pass from these tumours (especially in the lumbar region) through the spinal foramina, and then operations are apt to be followed by spinal meningitis. To prove this he refers to two histories of cases in the 'Pathological Transactions,' but the reference is made only from memory, and does not appear to be accurate. The fact, however, is probable, and worth remembering.

The following extracts refer to topics of general surgery and surgical pathology.

Cancer.—A new method of treatment. By W. H. Broadbent, M.D. Churchill, 1866.—Dr. Broadbent communicated to the meeting of the British Medical Association at Chester, in August last, a new method which he has lately adopted for the treatment of cancerous tumours, together with the results hitherto obtained. Dr. Broadbent had been led, by the ease with which the hypodermic method of medication is now applied, to experiment on hopeless cases of recurrent cancer by the hypodermic injection of fluid into their substance, and selected acetic acid for the following reasons:

1. That it does not coagulate albumen, and would therefore be disseminated through the tissues.
2. That if it entered the circulation it could do no harm, either by acting as a poison or by inducing embolism.
3. That it rapidly dissolves the walls and modifies the nuclei of cells

on the microscopic slide, and might be expected to do this when the cells were *in situ*.

4. That it has been applied with advantage to open cancer and to cancerous ulcerations.

The experiment was made; and it was found that acetic acid, though in healthy tissues it causes severe smarting and burning, unless very strong, gives little pain when thrown into malignant structure; on the other hand, it acts energetically on cancer, but has comparatively little effect on normal structures.

Dr. Broadbent speaks thus with respect to the details of the injection:—"I am not prepared to lay down precise rules for the employment of the acid; but my experience inclines me to the use of a large quantity of dilute acid, rather than a smaller proportion in more concentrated form. The strongest acid I have used has been composed of equal parts of water and of the strong acetic acid of the Pharmacopœia; the weakest, 1 part to 4 or 5.

"The injection should be gradual, especially when the tumour is dense, as pain may be inflicted, either by escape of acid by the side of the needle or by the tension caused by the fluid forced in. The indication I shall take for my guidance will be pain. When this attends any operation, I should reduce the strength of the acid and the force of the injection until it is no longer severe, and only when this has proved inoperative go on to more energetic measures. Dr. Richardson's ether spray apparatus will be most useful in preventing pain."

Dr. Broadbent's pamphlet contains detailed notes of 4 cases under his own care. We cannot reproduce these cases in much detail, but will state their general effect. The first was that of a lady aged 60, who had had a cancerous tumour of the breast twice removed with the knife, the tumour having recurred near the cicatrix. The tumour was injected 5 times in 6 weeks with about 20 or 30 minims of a mixture of acetic acid to 2 or 3 parts of water, with the effect of causing shrivelling of the tumour at the inner part and a cavity between the tumour and the skin to which it had been adherent; but as the tumour continued to spread upwards towards the shoulder, it was now injected every day. This caused sloughing. Dr. Broadbent says—"The energetic measures taken seem to have had the present result of removing entirely the remains of the disease. Time will show whether it will again reappear. On Aug. 12 every part of the wound was granulating; on Sept. 4 it was nearly healed."

The second case was one of cancer in the glands of the axilla, after the removal of a cancerous breast. They were pressing on the vein, so as to cause swelling and loss of motion of the arm, and the glands in the neck were also enlarged. The effects of the treatment were to cause contraction of the diseased glands and diminution of the swelling, with, perhaps, some increase in the power of using the arm.

The third case was that of a woman with obstruction of the rectum from a cancerous tumour. This was repeatedly injected with 3ss—3j of the mixture of acetic acid with 2 parts of water, and lint soaked in acid was applied to the surface of the tumour. Under this treatment the tumour seemed to diminish. Dr. Broadbent reports—"The passage

is kept open, and the pain, which was rapidly wearing out her strength, is relieved. She considers herself nearly well; but the disease is not eradicated, nor can this result be looked for."

In connection with this case, Dr. Broadbent refers to one under the care of Mr. Alfred Cooper, Surgeon to St. Mark's Hospital for Diseases of the Rectum, in which the disease was of long standing. The patient's sufferings were extreme, and he was in the last stage of exhaustion. There were evidences also of extension of the disease to the liver. No hope could be entertained of saving life; but it seemed possible that some relief might be given, and at the worst an opportunity would be afforded, by post-mortem examination, of ascertaining the effects of the injection. On examination the finger came upon a mass of disease, apparently filling the entire pelvis, and the canal by which faecal matter passed could not be made out. Three injections were made between July 6 and 13. "He experienced no marked relief, till on Aug. 28 he passed a solid substance, described by himself as 'being large enough to cover a crown-piece, and as tough as chamois leather,' after which he suffered less. His strength, however, was exhausted, and he died on Sept. 7. On post-mortem examination the obstruction in the rectum was found to have entirely disappeared, and no trace of the tumour was to be found. The liver and other abdominal organs were extensively affected with cancer."

Dr. Broadbent's 4th case was one of cancer of the tongue, with enlarged glands. There was an ulcer with a hard base and enlarged glands. This patient seems to have been less decidedly benefited than the others. After the treatment "the surface of the ulceration was clean, and scarcely any hard base existed; but it had extended more towards the tip of the tongue. This organ was more movable. The glands remained large."

Dr. Broadbent remarks that the treatment does not necessarily contemplate the entire disintegration of the tumour and its removal by sloughing, but that it may be sufficient if it causes the tumour to wither away and arrests its spread into the system; and some of the cases which he relates lead to the belief that this may be effected. In other cases—as when a malignant tumour is producing obstruction—it may be better to seek for its entire removal and disintegration, a termination which, he remarks, is always within reach by this method.

On this subject of the treatment of cancer by injection the reader should also consult a paper by Mr. Moore, in the '*Brit. Med. Jour.*,' Nov. 17, 1866.

On the results attending the removal of the first growths of cancer, see Birkett, *ibid.*, Sept. 29, 1866.

Moore, '*On the Antecedents of Cancer.*' A pamphlet reprinted from the '*Brit. Med. Jour.*,' Aug. 26, 1865.—This is an attempt to find a reply to the question—Are there any antecedent conditions influencing the production of cancer? Mr. Moore avows that he "is not in a position to demonstrate any such anterior occasion of the disease." But he shows that the facts relating to cancer are not in harmony with the theory that the preliminary fault

is in the blood. For, he says, "were cancer in the blood before its deposition in the tissues, it should be far less subject than it is to the local influences of the part in which it breaks out. The extirpation of the first tumour should in no way affect the progress of the disease in other parts. And further, acute diseases affecting the blood should also have an appreciable effect upon it." Similarly he shows that there is no real connection (although some superficial resemblance) between cancer on the one hand and syphilis and phthisis on the other, nor any proof at present of an unhealthy condition of viscera as a preliminary condition of cancer. Then occurs the general question, whether cancer is originally a constitutional disease or no. The arguments in favour of this conclusion are first examined. They are derived from—

1. Its final universal diffusion throughout the body. But it is shown that this universal diffusion is a late phenomenon in the disease, and that it can generally be proved, and is always most probable, that the whole series of tumours have depended upon a single original tumour.
2. Its occasional outburst in many primary tumours simultaneously. But Mr. Moore questions this fact, which rests, he says, on traditional authority, and is not met with under the more exact observation of the present day.
3. Its capacity to grow in various textures. But this is as easily explicable from the travelling of the elements of the first tumour as from constitutional vice.
4. Its local recurrence after the removal of the first tumour. But this, it is argued, proves no more than that the disease was not at first completely removed. "Minute fragments, or prolific elements of the disease, are sometimes left in the wound, and others may exist, which are beyond detection, in the glands or in an internal organ." Reference is made under this head to a family of which 6 female members had cancer each in the left breast. Yet two of the sisters passed 11 and 12 years respectively after the removal of the breast without recurrence of the disease, and upon its return and a repetition of the operation each remained healthy for 7 years more, and no further recurrence is yet known to have taken place.
5. Its appearance in internal organs, notwithstanding the removal of the primary tumour. But there is no proof that the germs were not disseminated from the primary disease, or from minute portions of it left behind.
6. Its hereditary nature. This fact, again, Mr. Moore questions. He does not deny to parental influence some effect in the production of cancer; but he adduces facts to prove that hereditary transmission is rarely noticed compared to the total number of cases, a direct transmission of the disease from parent to child being traceable only about thrice in a hundred cases. The bearing of the facts of both similar and dissimilar cancers occurring in parents and offspring is discussed; and as an argument against the hereditary theory, it is noticed that cancer is least common at the period of life when parental influence is most active—*i. e.* in infancy. So also in infants born while the mother is suffering from cancer, the disease is not transmitted, nor in families born from a cancerous mother is it the younger children who are peculiarly liable. On the whole, Mr. Moore concludes that there is no proof of a more peculiar hereditary nature in cancer than in other affections, such as malformations, &c., which are obviously not consti-

tutional. 7. Its relation to tubercle. It is shown that no real affinity or connection has ever been proved.

As arguments for the local origin of cancer, Mr. Moore observes—1. Its invariable origin as a single tumour. 2. The manifest dependence of the later tumours upon that first. 3. The remarkable manner in which it is inherited as a local, and not as a constitutional, peculiarity—a disease of the corresponding organ of plural members of one family, while at the same time any inheritance of the disease is uncommon, and that by infants extremely rare. 4. Its preference of the healthiest persons. On this latter point Mr. Moore enlarges somewhat. He remarks, in the first place, that the cachexia attributed to cancer, though it may exist in later stages, is not characteristic of the early period of the disease. In fact, it usually attacks persons who have been all their lives in robust health; and if death happens from any accidental cause in the early period of cancer, all the organs of the body are generally found healthy, and at a later period of the disease the secondary deposits are found scattered in organs otherwise quite healthy. Cancer patients also are very commonly born of parents who have been very healthy and lived to extreme old age. Also it is often observed that cancer occurs in the earliest children of large families, who are personally the most vigorous; a table is given to show this (p. 35). Again, Mr. Moore shows by reference to the Registrar-General's returns, that there is a steady increase (about 200 per annum) in the deaths from cancer in London, coincident with the increase of wealth and the well-being of the population. Facts are also adduced bearing on the distribution of the disease in different parts of the kingdom and in different towns. All this leads Mr. Moore to "the general conclusion that cancer has no dependence on any malady anterior to the appearance of the first tumour, but that it originates in persons otherwise healthy and strong." "The existence of an antecedent general malady is, as far as I can perceive, pure conjecture, being entirely destitute of proof, or even of reasonable support."

Mr. Moore concludes his treatise with a conjecture as to the origin of cancer, referring it to an excess of formative power in the constitution over the demands of the organ, which is usually at the time in the wane of its functions. Thus, a sort of vicious embryo, or bud, is produced, and this, "with superior vitality, supersedes the waning or extinct forces of its site, which it destroys in place of renewing."

From the whole inquiry the following important practical deduction is made—"There is one conclusion from the facts brought forward in this paper, which, though collateral only, and not contemplated at the institution of the inquiry, is yet of too great importance to pass unnoticed. I allude to the valuable arguments furnished by them for early operations in cancer, and an argument which corresponds with their comparative success. While yet the first tumour has undergone little diffusion there is hope of a complete extirpation of the disease, a hope which quickly fades away as the tumour grows."

Billroth, "On Traumatic Fever and Traumatic Affections" ('*Langenbeck's Arch.*, vi, pp. 372—495).—This is a continuation of a previous

work by the same author, published in the 2nd volume of the same 'Archives.' We must endeavour very briefly to point out some of Dr. Billroth's chief conclusions, without venturing on a full abstract of the paper.

He first gives some experiments to show that in wounds and in other inflamed parts the temperature is below that of the blood, consequently that it is not possible that heat can be developed in the wound which is propagated to, and raises the temperature of, the whole mass of the blood.

Next, in animals in whom pus or putrefying serum was injected under the skin or into the veins, he shows that in all cases, whether injected into the blood directly or taken up by the lymphatics after subcutaneous injection, it produced fever, and gives the details as to the rise of the temperature, which occurred in about 2 hours, and its fall to the condition of health when the animal was allowed to recover.

He then tried to ascertain on what component of the putrid serum the poisonous quality depends, injecting sulphuretted hydrogen, sulphuretted carbon, sulphuretted ammonium, and carbonate of ammonia, without any decided result. Leucine, however, always produced the same rise of temperature as the putrid serum itself. Locally, sulphuretted ammonium induced suppuration, followed by some general fever (to be distinguished from the specific fever produced by the putrid serum, which comes on almost directly after the injection), and carbonate of ammonia would produce gangrene, something like alkaline urine. The others were locally harmless.

In some diseases the temperature falls much below the normal minimum. He instances as well-known cases the cold stage of intermittents, pyæmia sometimes, and extreme loss of blood, and, as less known and less exactly ascertained, extensive burns, uræmia when occurring suddenly, and some cases of blood poisoning (septicæmia). He says that the same takes place, though not constantly, in traumatic peritonitis. Observations are given of a fatal case of extensive burn, and he refers to the theory that death in such cases is caused by the suppression of perspiration, and to the support which this derives from Edenhuizen's observations (in 'Henle's Zeitschrift,' xvii, p. 35) of the considerable fall of temperature caused by enclosing animals in an intranspirable medium, and from the ascertained fatality of such a process. Edenhuizen's theory is that a gaseous nitrogenous body may be exhaled by the skin, possibly ammonia, or possibly a volatile organic alkali, an amin-base, the retention of which in the blood is poisonous. This subject naturally conducts to uræmia, of which a case is given following on acute nephritis, with acute inflammation and abscess of the prostate and corpora cavernosa penis, and where, notwithstanding this local inflammation, the temperature fell below the normal minimum, and so remained. In 2 cases, in which the patients died after injuries accompanied by emphysema from decomposition of the extravasated blood, he has also noticed a fall in temperature. All these cases seem to depend essentially on the retention of ammonia in the blood. It is next shown by experiments on animals that the injection of a solution

of carbonate of ammonia into the blood does cause a considerable fall of temperature, and that such a fall is not caused by injection of distilled water (as much as 9 oz. in one case) of a solution of urea, or of the residue of alkaline urine. Nor does injection of putrid serum into the blood cause any fall of temperature. Other substances also were tried, but the only one which would give a sudden fall of temperature is carbonate of ammonia. This fall is followed by a rise—in one experiment the temperature had fallen, 70 minutes after the completion of the injection, from 39·6 to 35·2, then gradually rose, till, 3½ hours after the injection, it was above the normal, 40·7, and then fell gradually to 39·1 (Centigrade). He shows (in opposition to Bobrik's experiments on rabbits) that acetic acid has no such effect.

The next chapter (xv) treats on the mode of origin and on the essential nature of the fever. In the first place, what are the direct causes of the increased temperature?—and, in the next, how are the causes of the fever brought into action? We have not the space to present our readers with any complete abstract of this interesting chapter. In answer to the former question, Herr Billroth does not venture upon any direct assertion, contenting himself with pointing out the various methods by which the temperature of the whole body may be affected, whether by the development of heat in excess of the heat given off or by the suspension of the cooling process. In answer to the second question, which is more directly practical, the author endeavours to prove that the direct excitant of the fever is the molecular disintegration of the pus, or other product of inflammation, and that such molecular products are transmitted into the mass of the blood by the lymphatic system.

The work concludes with two short chapters on the effect of dried animal and vegetable putrid matters, in which it is proved that such substances retain their poisonous properties after dessication, and thus the possible effects of the application of dirty dressings, sponges, &c., is explained.

In connection with this later work of Billroth's, we must not omit to refer, though necessarily very shortly, to a paper by Dr. Gibson, in the 'Brit. and For. Med.-Chir. Rev.,' Jan. 1866, p. 186, in which the results of the observation of 62 cases of traumatic fever are recorded. These observations are undertaken in order to test the accuracy of the opinions announced by Billroth, in the memoir of which an abstract was published in the 'Year-Book' for 1862. The conclusions of Dr. Gibson agree in the main with those of Billroth; and the reader will also find in this paper detailed observations on the pulse, temperature, and urine, in a certain number of the cases, as also on the indications for treatment.

In the second volume of the 'St. Bartholomew's Hospital Reports,' p. 46, Mr. Savory has written a paper "On the relation of Phlebitis and Thrombosis to Pyæmia," which is thus summed up by the author himself:

"Thrombosis may exist without any evidence of phlebitis, and very often without being followed by pyæmia.

"Phlebitis may occasionally exist without thrombosis, and often occurs without being followed by pyæmia.

"Pyæmia often exists without any evidence of thrombosis or phlebitis; still oftener, it occurs without any evidence whatever that it has been preceded by either of these or any other affection of the veins.

"It has, therefore, not been satisfactorily shown that either phlebitis or thrombosis stands, in any especial or peculiar manner, in relation to pyæmia, as cause and effect." For the reasoning on which these propositions rest, we must refer to the original. Mr. Savory adds, "It is a question whether, in those cases in which the veins are plugged or inflamed, thrombosis and phlebitis are not the local, and pyæmia the general, effect of the same cause."

"Contributions to the Knowledge of Congenital Hypertrophy of the Extremities." By, Prof. W. Busch ('Lang. Arch.,' vii, 1865-6, p. 174).—These are deformities consequent on excessive formation of a segment or the whole of a limb, which seem to depend on enlargement of all its parts, leaving the limb just as useful as before. [In one case described by Chassaignac, 'Gaz. des Hôp.,' 1858, p. 215, the hypertrophic limb was the stronger.] Such partial hypertrophies as affect single fingers, toes, or larger segments of the hand or foot, may be divided into two main groups—the former, in which the bones are of gigantic size, and all the other parts of the limb in proportion; the second, in which the skeleton is also gigantic, but there is besides an especial tumour-like development of the soft parts, especially of the adipose tissue, so that the limb is deformed as well as gigantic.

In the first group (simple macrodactylies) there are cases where the phalanges articulate in the normal way, and others in which they are variously misplaced. The common observation, that the hypertrophy of the bones is greatest towards the joints, renders it probable that such abnormal positions are due to alterations in the epiphyses and articular surfaces. This kind of macrodactyly is far more common in the fingers than the toes. Cases are cited from foreign and English sources illustrating this hypertrophy without disproportion. The second class, hypertrophy with excessive over-development of soft parts, is also illustrated by published cases, and, finally, by two of his own. In one of these the foot was so heavy and inconvenient that it was amputated by Pirogoff's method, and a long and very complete description of the anatomy of the foot is given. In this case the hypertrophy affected chiefly the second and third toes, though the first was also, but less, hypertrophied. The fourth and fifth were normal. The tarsal bones were also somewhat larger than natural. There were large masses of hypertrophied fat in various places, and even up the leg. The bones of the leg were also hypertrophied, and this had not been noticed before the amputation, so that after recovery he had to wear a high-soled boot on the sound leg. The veins of the amputated foot were especially hypertrophied. The second case was an hypertrophy of two toes, with extreme development of subcutaneous fat. In both

cases the hypertrophied parts were increasing out of proportion to the rest of the body, and the author remarks that this tendency is, at any rate, very commonly observed in those hypertrophies which are accompanied by fatty out-growths, while in the well-proportioned hypertrophy the growth does not seem to increase out of proportion to the rest of the body.

We must refer to the original for the author's remarks on the abnormalities of the vascular and osseous systems which are commonly found in such cases.

The following refer to miscellaneous subjects:

"Hydatid Cyst of the Liver" ('Gaz. Méd. de Paris,' 1865, p. 570).—M. Boucher gives a full account of one case, and refers to four others, in the practice of M. Demarquay, in which these tumours were treated with perfect success by the following method:—1, Opening into the tumour by means of a caustic issue (without any incision through the eschar); 2, fixing a large elastic gum catheter in the opening, with a stopper; 3, injecting a very dilute solution of iodine into the tumour repeatedly, until the cavity is nearly obliterated and the débris of the hydatids have come away.

A very full tabular account of the published cases of this disease, along with the history of an interesting case of his own, will be found in the last (xlix) vol. of the 'Med.-Chir. Trans.,' p. 79, by Dr. John Harley.

"On Congenital Cystic Tumour" ('St. Bartholomew's Hospital Reports,' vol. ii, p. 16).—Mr. T. Smith calls attention to the usual localities in which is found the congenital cystic tumour which often occurs in the neck, and which has been previously treated of by Mr. Cæsar Hawkins and by the present compiler. He relates or refers to cases in all situations in the neck and trunk, but says that no case is on record in which it has appeared in the extremities. He gives some interesting examples of the great resemblance which this affection may bear to spina bifida. Mr. Smith remarks on the occasional spontaneous disappearance of the growth, of which no less than three instances have occurred in his own practice. But the most important part of the paper is the value which Mr. Smith is led from his personal experience to attribute to the use of very fine setons, composed of a single thread of fine silk or sewing cotton, and passed, if possible, through but one cyst of the growth at a time, and to this end not plunged deeply into the tumour, but made to pass through the part nearest the surface. The thread is to be withdrawn as soon as any appearance of inflammation with induration is set up, and, if possible, before the occurrence of suppuration, the occurrence of this process being undesirable. No incisions into the growth should be made unless suppuration has unmistakably occurred. It is not always necessary to continue the introduction of setons into each of the separate cysts of a large growth, as when once the tumour has begun to contract the process will often continue spontaneously. Short notes are given of 5 cases, in 4, at any rate, of which Mr. Smith is able to report the complete disappearance of the disease. In the 5th the tumour, which was of large size,

situated on the thorax, was much smaller, but had not entirely disappeared, three months after a single introduction of the seton.

We now proceed to affections of the nose and mouth :

“On a New Mode of Treating Diseases of the Cavity of the Nose.” By J. L. W. Thudichum, M.D. (*‘Lancet,’* Nov. 26 and Dec. 3, 1864).—Dr. Thudichum calls attention to the unsatisfactory nature of the local treatment of most of the diseases of the nose, in consequence of the inaccessibility of the recesses of the nasal fossæ to the topical applications prescribed, when applied in the ordinary manner—that is, by a common syringe, or by ointments applied to the lower and part of the middle meatus. In order to remedy this difficulty, Dr. Thudichum has made use of a discovery made by Prof. Weber, of Leipzig, and published in *‘Müller’s Archiv,’* 1847, viz., that, “when one side of the nasal cavity is entirely filled with fluid by hydrostatic pressure, while the patient is breathing through the mouth, the soft palate completely closes the choanæ, and does not permit any fluid to pass into the pharynx ; while the fluid easily passes into the other cavity, mostly round and over the posterior edge of the septum narium, in some persons also through the frontal sinuses, and escapes from the other open nostril, after having touched every part of the first half of the cavity of the nose, and a great part, certainly the lower and median canal, of the second half.” For this purpose Dr. Thudichum uses a metal rod 30 inches in length, with a heavily loaded foot, on which a high cylindrical glass vessel travels by means of a nut and screw. The glass vessel is open above to receive the fluid to be injected, and terminates below in an india-rubber tube, with stop-cock, to which a nozzle of horn or india-rubber is attached, of such a shape and size as accurately to fit the nostril.* The person is seated with his head over a basin or funnel, and, if he will take care to breathe exclusively through his mouth and abstain from swallowing, no fluid will pass down the throat, but it will all run out of the opposite nostril, carrying with it any sordes, blood-clot, or discharge, which may have accumulated in the nostril into which the nozzle is fitted. By altering the height of the glass jar the force of the stream is increased or diminished, and by pressing on the india-rubber tube with the finger the jet of fluid can be increased or stopped at will, which becomes necessary if the person gets confused and begins to speak or to swallow. When one side has been thoroughly cleansed the stream is to be stopped, and the current reversed, by applying the nozzle to the other nostril. Many diseases of the nose are susceptible of relief in this way ; according to Dr. Thudichum, the sense of smell can often be restored, and the formation of polypus be averted. As to the fluids to be used for rinsing out the nasal cavity, Dr. Thudichum gives elaborate directions, for most of which we must refer the reader to the original paper. Pure water, according to him, excites tears and sneezing (a kind of cold) from its

* Simpler apparatus can easily be extemporised, and will answer the purpose pretty well. A common syphon in a jug of the injection, with a tube fitted on, can be used on an emergency ; but it is of importance, if possible, always to have a well-fitting nozzle, otherwise the operation will sometimes fail.

difference in specific gravity to the blood. Hence, it is desirable for merely washing the nose to use a solution of common salt (1 oz. to a pint), or of other salts (such as phosphate of soda or phosphate of ammonia and soda), or of sugar or milk. For deodorising the nose, a dilute solution of permanganate of potash is recommended; for restraining hæmorrhage, ice-cold salt water, or, if this is not sufficient, the same with the addition of an ounce of the tincture of the sesquichloride of iron to the pint; for astringent purposes, the solutions of alum, sulphate of zinc, and sulphate of copper; as alteratives, nitrate of silver and bichloride of mercury; as specifics, solutions of chloride of calcium, in which suboxide or oxide of mercury is suspended in a finely subdivided state, together with the bichloride solutions; as a stimulant, a mixture of eau-de-Cologne with water or salt water. The nose is to be well rinsed with the indifferent washes before any of the more active lotions are used.

Annandale, "On Closure of Fissures of the Hard and Soft Palate." Edinburgh, 1865, pp. 8.—Mr. Annandale, in this paper, relates two cases in which he operated for the closure of fissures, involving in the first case the whole of the soft and hard palate, and in the second the soft and the posterior third of the hard palate. Both operations were successful.

Mr. Annandale's plan differs from those in common use in the following respects. In the first place, he attempts to close the entire cleft at a single operation. In both the cases here related that attempt succeeded, except that in the first case, where the fissure extended through the whole palate, the patient became so faint that the last stitch through the edges of the uvula could not be placed, so that this deficiency had to be subsequently rectified. Mr. Annandale says, however, that there are cases (apparently those in which the patient is not strong enough to bear the whole operation) in which he should close the fissure on two different occasions, the fissure in the hard and as much as possible of the soft palate being united in the first operation, and the remainder subsequently.

Next, Mr. Annandale regards the division of the muscles as an unnecessary complication of the operation. No attempt was made to divide any muscles in these two operations, yet both succeeded.

Thirdly, Mr. Annandale makes very extensive lateral incisions, much freer, he believes, than have ever before been practised in these operations. He separates the soft tissues (periosteum and mucous membrane) from the bone with Langenbeck's instrument (which he prefers to those in common use) along the whole of the hard palate, having first pared the edges, leaving "an attachment in front and behind, at the point where the blood-vessels and nerves enter these structures." Then an incision, extending from the canine tooth in front to the last molar behind, is made through the soft textures on each side along the alveolar ridge.

The inner edges of the flaps along the whole of the hard and soft palate are then brought into contact with silver-wire sutures. These sutures are fixed by "passing a thread through each edge of the wound

separately, uniting these threads together in the way described by Mr. Syme in his 'Principles of Surgery,' p. 526," and then drawing a piece of silver wire through by means of the united thread; this is then "twisted or adjusted, so as efficiently to keep the margins of the wound together." The stitches in the soft palate were not interfered with till the 9th or 10th day after the operations. The stitches in the hard palate were removed much sooner. Mr. Annandale says that, "if the stitches in the soft palate are not causing much irritation, they should be allowed to remain even longer than 10 days—a fortnight at least. For although the wound may be united before this, the union is not strong, and may be ruptured by excessive movements of the parts. There does not appear to be the same risk in regard to the wound over the hard palate." No food which required much mastication was permitted till the end of three weeks after the operation. The patients were confined to bed, and forbidden to talk for the first week.

In a postscript Mr. Annandale refers to a third case, operated on since the paper was written, in which he extended his lateral incision even further by carrying it round the last molar tooth close to the dental margin of the gum. "By this means tension may be more completely taken off the margin of the wound in the soft palate without any division of the muscles."

Dr. Beck has also given two cases in 'Langenbeck's Archiv,' 1865, p. 736, in which he undertook to close total fissures at a single sitting. The first case was an ordinary one of fissure of the entire palate, in a girl 19 years of age. The whole cleft was brought together at once, the operation lasting an hour, and the patient recovered completely. The second case, however, is deserving of a more special notice, as being the most extensive operation in this respect at present on record. The patient was a man æt. 29, suffering from a horrible deformity of the face, which is thus described:—"Instead of a well-formed nose, there was hanging over the opening of the nostrils a short flap of skin, which was flaccid, except at its edges; there was no bridge and no alæ of the nose. The upper lip was completely cleft in the centre, and was represented merely by a red edge, which blended on either side with the cheek, leaving in the middle a broad and deep cleft, bounded on either side by two projecting masses of bone, each bearing a large canine tooth, below which the large prominent tongue projected out. On opening the mouth it was seen that the cavities of the nose, mouth, and pharynx, were uninterruptedly continuous. By the entire absence of the upper lip, as well as of both intermaxillary bones, the palatine processes of the upper jaw and palate-bones, and the septum nasi, by the imperfect development of the vomer (to which the middle of the nasal flap above mentioned adhered by means of a short ligament), by fissure of the whole soft palate, and by a simultaneous totally perpendicular position of the alveolar processes of the upper jaw, with deficient development of the teeth, a great cavity was formed, in which were seen the base of the skull above, the wall of the pharynx behind (covered with pus and traces of old ulceration), deep downwards the epiglottis, and on the two sides the Eustachian tubes and the small moieties of the soft palate, which almost disappeared when its muscles acted."

The operation required to remedy this enormous deformity was completed at a single sitting of 3 hours. The reasons for this course are not very clearly stated. The whole edge of the cleft was pared, lateral incisions were made along the inner side of the teeth through the whole length of the hard palate, which was detached from the jawbone by working from this incision; then the muscles of the soft palate were divided, and the soft palate was loosened from the hard, and the muscles of the velum were divided. Thus two long pendulous flaps were formed, touching each other in the middle line. The sutures (9 in number) were not fixed in the palate till the necessary incisions had been made in the face. The remnants of the lip were loosened from the upper jawbones by drawing semilunar incisions around the alæ nasi, and forming flaps which met in the middle line for a lip. The central piece was detached from the vomer, and raised by means of a needle thrust through it and supported by small pieces of cork. The whole was covered with wet rags, in which holes were cut for the mouth and nose, and fluid nourishment was given.

The patient was attacked on the 3rd day after the operation with erysipelas, and this was followed by a metastatic abscess in one foot; but the only part of the wound which did not unite was a portion of the hard palate, in which a hole about an inch long ultimately remained. The patient was thus restored to a tolerable appearance and to the power of intelligible speech.

This is believed to be the most extensive operation hitherto performed with success for such a deformity.

Dr. Passavant has published in 'Langenbeck's Archiv,' 1865, vi, p. 333, his views upon the cause of the defect of speech usually left after successful operations for cleft palate, and on the way to remedy this. The author points out that, in order to avoid a nasal tone in the speech, the soft palate, when in its natural condition, is brought into contact with the back of the pharynx in speaking. In cases of staphylopharyngitis for cleft of both the hard and soft palate this is usually impossible, in consequence of the soft parts, after union of the cleft, not having sufficient length to touch the back of the pharynx. In less extensive clefts, involving the hard palate only, this is the case, even when the opening is closed by spontaneous union of the soft parts. On the other hand, in congenital cleft, involving the soft palate only, natural articulation is in many cases obtained; and this is still more certainly the case after the closure of a healthy velum palati which may have been divided in a surgical operation on the pharynx, or after an accidental hole, as from syphilis, &c. These different results are referred by the author to the differences in length of the velum with reference to the pharynx. Since this length cannot afterwards be changed, it is vain to expect any improvement from exercise on the patient's part; and in such cases, although his speech may be so far improved by the operation as to have become intelligible, it will never be natural or pleasing. If the palate be examined it will be found impossible, even with the assistance of a spatula, to bring the posterior edge of the velum over to the back of the pharynx.

Nor could this end be attained by operating early in childhood. He

refers to a case where the cleft closed spontaneously at the age of six. The child, however, still spoke with a nasal tone, and the palate was shortened. Another case is also described, in which an adult presented traces of a similar spontaneous union at some very early period of life, yet the palate was deficient in length and the voice nasal.

In order to put the soft palate in a position to close the pharynx, the author describes three different proceedings, the first of which, however, is, he says, unsatisfactory. It consists in extending, as it were, the operation of staphyloraphy, so as to unite the palato-pharyngei muscles for a certain length (in one case operated on by the author as much as an inch) across the middle line. Three such attempts, however, in all of which union succeeded, did not produce the desired effect, though the speech was improved.

A second proceeding, of which he speaks in more encouraging terms, is what he calls "staphylo-pharyngoraphy," which consists in uniting the centre of the soft palate (uvula, &c.) to the back wall of the pharynx, leaving an opening on either side, by which the air can pass in respiration, but which can easily be closed by the muscles in speaking.

This difficult operation is thus performed:—A transverse incision of the necessary length is made through the attachment of the soft to the hard palate. The posterior edge of the soft palate is then seized by an assistant with a sharp hook, and drawn forwards and downwards, so as to turn its posterior edge to the operator, who is to pare it with a long, thin, straight knife. This is facilitated by passing a bent spatula through the transverse incision, and gently supporting the soft palate in the desired position. The refreshed edge of the soft palate is then to be adapted to the pharynx. For this purpose the mucous membrane must be removed from the latter by means of a knife bent at right angles, and then two sutures are to be passed with short semicircular needles mounted on a needle-holder.

A case is given in which this operation was practised. The transverse wound in the soft palate closed spontaneously, the central part united firmly to the back of the pharynx, and the speech was so much improved as to be nearly natural, though it seems not perfectly so.

A third proceeding is given, which is much easier. It consists in an attempt to displace the whole soft palate backwards. An incision is made on either side from near the hamular process, about an inch towards the central incisors. These are then united by a transverse incision, and the parts are all dissected up and the anterior end of the flap united in its new position, thus leaving a large hole between the nose and mouth.

He gives a case of this operation also. The patient had much improved in speech, when the hole was closed by a plug; and the author proposed to himself at some future time to close the hole between the nose and mouth by transplantation of some of the soft tissues of the vault of the palate.

In the '*Gaz. des Hôp.*,' July 29, Aug. 3, 1865, Nos. 89, 91, is a discussion, at the Société de Chir., on some cases of staphyloraphy by M. Trélat. The only points which call for notice appear to be that M. Trélat divides the muscles, which seem to require it after he has brought the flaps into apposition and tied the sutures, and that he keeps

his patients without food for about four days after the operation, nourishing them by the rectum. Most of the speakers in the discussion adopted the view announced by Herr Passavant in the last extract, that the defect in articulation depends chiefly on the want of contact between the soft palate and the back of the pharynx. M. Trélat says that Gerdy had made the same observation before.

Excision of the Tongue.—Numerous cases of excision of the tongue have been recorded under the care of Syme, Paget, Nunneley, and other surgeons. The following is extracted from a clinical lecture on the removal of the tongue with the *écraseur*, by Mr. Paget, in the 'Med. Times and Gaz.,' Feb. 10, 1866:—"The motive to operate here, as in other cases, is either to prolong life or, without shortening, to comfort what remains. For the first there is, I believe, some advantage—not a great prolongation of life, yet enough to justify an operation which is attended with very little suffering or risk; but the chief motive is in the hope of comfort, and the comfort that may be gained is in many cases so great as to justify a greater risk of life than is incurred in any of the ordinary operations for the removal of cancer of the tongue. The risk is really very small. I have not had a fatal case or witnessed one; and the comfort given is that the patient is delivered for the time from all the misery of one of the most distressing and disabling conditions of disease, and till the cancerous growth is renewed may enjoy complete health and do all his work. Doubtless the disease will return after the operation; but it is as unreasonable to refuse a painless operation, and one free from risk of life, because the disease will return at some time soon after it, as it would be to refuse a course of medicine because it gives only temporary relief. When a man has only, suppose, two or three years to live, it is no small advantage if at least half the time can be spent in comfort rather than in misery, and in profitable work rather than in painful idleness. Looking back on the many cases of cancer of the tongue that I have had to do with, I should be disposed to say that there is no organ on which operations for cancer are more justly performed, or are more to be urged, even in extreme cases. For the method of operation the choice lies between the knife and the *écraseur*. Caustic is not to be thought of, unless in a case of the very smallest extent; and the cases in which the ligature should be used must be extremely rare. I have never employed it, for the only advantage which it offers—that of avoiding hæmorrhage—is just as well, and much less offensively, obtained by the *écraseur*. The risks and trouble of hæmorrhage are, however, much overrated; and I believe the knife may be preferred to the *écraseur* in all but the largest operations, such as those for the removal of the whole tongue."

In the 'Lancet' for Jan. 27, 1866, is the report of the then present condition of a patient in whom Prof. Syme had removed the whole tongue on Dec. 29, 1854. The wound made in the operation through the jawbone and lip had soundly united without any deformity. The opening between the mouth and pharynx was diminished and irregular in shape, but he could swallow as well as ever, provided the food was finely divided. He could also masticate solid substances, though diffi-

culty was experienced sometimes from their getting into awkward parts of the mouth. He could speak very clearly, and sing without difficulty. A few consonants (*d*, *j*, *g*, and *s*) were not quite clearly articulated. He could distinguish different articles and their qualities by the taste; but the sense of taste resided in the upper part of the pharynx, as was proved both by the patient's own sensations, and by applying sapid but non-odorous solutions (salt and sugar) to the mucous membrane of the mouth, when their taste was not distinguished. Prof. Syme observes, "Of the facts above mentioned, the one which seems most curious is the connection between taste and deglutition, from which it appears that the latter is essential for a full perception of the former. If the pleasure of taste could be perfectly gratified by mastication without deglutition, there would be no limit to the consumption of food; but the instinctive desire to swallow an agreeable morsel affords a check to any such abuse."

In the '*Gaz. des Hôp.*,' May 20, 1865, will be found a short account of a case in which M. Demarquay had tied both lingual arteries, in order to produce atrophy of a large tumour of the tongue. At the time of his exhibition to the Société de Chirurgie the tumour had much diminished in size, though the patient was not completely cured. The tumour had been so large as almost entirely to preclude speaking, mastication, and swallowing. At the time of the report the patient could speak, eat, and swallow without any great difficulty. M. Broca remarked that he had adopted a similar proceeding to the spermatic artery in a case of tumour of the testicle with success.

"New Operation for Naso-pharyngeal Polypus" ('*Gaz. des Hôp.*,' 1865, p. 575).—M. Alphonse Guérin relates to the Société de Chirurgie de Paris an interesting case of naso-pharyngeal polypus, which he removed in a somewhat new fashion. The tumour was altogether of an enormous size, so much so that the boy (æ. 17) could not breathe except with the mouth half open. The velum palati was so displaced that its posterior surface was turned down towards the base of the tongue. It was impossible to make out the point of attachment of the tumour, but it appeared to be somewhere near the left posterior nares. He was a good deal exhausted by previous hæmorrhage, &c., but otherwise in good health. M. Guérin began the operation by dividing the velum palati down its centre. He was thus able to draw into the mouth a polypous mass about as large as a hen's egg, and to sever its pedicle without difficulty and with little bleeding, though enough to be dangerous in the patient's weak state. However, on examination it was found that the bulk of the disease was left behind in the form of a large transverse mass, round which the finger could not be passed, and which appeared incarcerated in some way that could not be made out. The finger was carried down behind the mass from the mouth, and a rasp was pushed through the nostril on to the base of the skull, and thus the polypous mass was detached from the cranium, together with what remained of the pedicle of the former tumour, which was still bleeding. By pressing the tumour from its attachment in this way a large bony cavity was exposed, which seemed to be the dilated

spheroidal cell. Now the pedicle of the polypus was easily felt, but it was very difficult to sever it. This was done at first with the point of one blade of the scissors, which had been used in the former part of the operation, then with a regular rasp. The bones were then felt rough and devoid of their periosteum. There was little bleeding. Three days after the operation the electric cautery was applied to some inequalities felt near the pedicle of the minor polypus, under the fear that this might be a new growth. The patient recovered completely.

M. Guérin believes that voluminous tumours may be removed in this way without any section of the soft palate, and without much inconvenience to the patient. He says that in such cases, the pharynx being accustomed to the presence of a large foreign body, the introduction of the finger is easier, and gives less annoyance than would be imagined from the analogy of healthy persons.

For a case of naso-pharyngeal polypus, removed by excision of the upper jawbone after several attempts to remove it by partial operations on this bone, the operations being followed by the appearance of a traumatic aneurism in the pharynx, which was cured by the injection of the perchloride of iron, see M. Michaux, in the '*Bulletin de l'Académie Royale de Médecine de Belgique*,' quoted in the '*Gaz. Méd. de Paris*,' 1865, p. 650.

See also, under the same references, a paper by the same author, on the "Development of Multilocular Cysts at the Base of the Skull."

The following extracts refer to the surgery of the larynx:

Scalds of the Glottis: Treatment ('*Brit. Med. Journ.*,' June 16, 1866).—At a recent meeting of the Surgical Society of Ireland Mr. Croly read a paper on "Scalds of the Glottis, and their Treatment by Mercury." His object was to show the advantages of a mercurial treatment. He gave a table of 14 cases of scalds of the glottis, in which tracheotomy was performed (in England), and of which 11 died. He also gave a table of 6 other cases (in Ireland) treated with mercury without operation, all of which recovered. In conclusion, he offered the following aphorisms, the result of his inquiries:—1. The water is not swallowed, but the steam produces œdema of the glottis. 2. The affection is divided into three stages (Dr. Bevan). 3. The symptoms are not urgent at first, and are apt to mislead those not experienced in such cases. 4. Active mercurial treatment (not antiphlogistic) is important from the moment when the child is first seen, by applying strong mercurial ointment to the axillæ, chest, and inside of the thighs, and administering calomel in grain or two-grain doses every half hour or hour. 5. The apartment must be kept warm (a thermometer being used for guidance) to prevent chest complications. 6. Depletion by leeches or antimony must (if adopted) be used early, and with caution. 7. The collapse should be treated by stimulants if the child can swallow; if not, stimulating and nutritive injections should be administered, the extremities being kept warm. 8. The lungs are almost invariably congested at some period of the illness, bronchitis or pneumonia being a common cause of death. 9. He suggests dry cupping over the back of the lungs, followed by turpentine fomentations, to

relieve pulmonary congestion. 10. When the green stools appear early (or salivation occurs) the child gets suddenly well. This is very remarkable, and occurs most unexpectedly. 11. Tracheotomy ought not, in his opinion, to be performed in these cases.

In the 'American Journal of the Medical Sciences,' April, 1866, p. 378, Dr. Hunt gives a tabular view of all the cases (27 in number, besides 2 doubtful) of fracture of the larynx and rupture of the trachea which he could find on record, accompanied by notes of a fatal case which occurred in his own practice. In the same journal (Jan. 1866, p. 261) is the account, extracted from the 'Canada Medical Journal,' of a case under the care of Dr. McClean, which was complicated with œdema glottidis, but recovered after tracheotomy.

As to symptoms, Dr. Hunt says there are always dyspnœa, orthopnea, and emphysema, with the consequent distress, anxiety, and lividity of surface. There may or may not be pain and cough; deglutition is sometimes easy. Bloody expectoration, in conjunction with the above symptoms, is regarded by Dr. Hunt as almost diagnostic, and if the voice should be reduced to a hoarse whisper the larynx will be the seat of the laceration. There is usually so much swelling as to render an examination of the larynx with the fingers impossible, otherwise crepitus may be detected. The prognosis is grave; of the 27 cases 17 died. As to age, though Morgagni says (but without giving details) that he has seen this injury, and always in advanced age, Dr. Hunt finds that out of 15 cases in which the age was given only one (a female, æt. 66, was over 45 years, and 5 were children, 1 of them only 4 years of age. A fall against some projecting body is the usual cause.

As to treatment, 10 recovered out of the 27 cases; 8 were operated on, but 2 died, leaving 6 recoveries after operation and 4 without. These 4 "recovered under bleeding, rest, silence, &c.; but they were separations in the median line, and, I infer, did not lacerate the mucous membrane, as emphysema and bloody expectoration are not mentioned in any of them. In fact, Gibb, who reports one of them, says that the patient complained of loss of voice, and of an indescribable sensation in the throat, and that there was neither difficulty of breathing nor displacement, except when made by the examiner." Similarly of the other cases which recovered without operation. "But these cases are rare. I think our list shows that active and prompt treatment by *laryngotomy* or *tracheotomy* gives the only hope of success, where the emphysema and bloody expectoration show that the mucous membrane has been lacerated by the broken fragments. . . . If, then, after getting the history of a case, we have bloody expectoration and emphysema accompanying the other symptoms, an operation should be at once performed, *for we have obtained no record of such a case getting well without it.*" Some delay is not, indeed, incompatible with recovery, as in Dr. McClean's case, where the operation was not performed till the sixth day; but when the case has been satisfactorily made out no delay should be admitted. The power of natural respiration is usually regained. In only 1 of the 6 successful cases was it necessary to wear the tube permanently. Chelius speaks of cutting open the larynx

freely in the median line, and replacing the broken cartilages; but it seems to Dr. Hunt that this is unnecessary in ordinary cases, and in severe ones, where there is much comminution, would be impossible. Eichmann, however, succeeded in elevating a piece of the thyroid cartilage by means of a bent polypus forceps.

Besides these cases, Dr. Hunt has read that during the recent civil war laryngotomy or tracheotomy was resorted to 15 times, with 6 recoveries. The details of these cases have not been published, but doubtless some of them were for injury to the main air-passages. It is not intended to include gunshot-wounds in this paper, but some of them require to be treated on the same principle as internal fracture and rupture. In one of the cases in this table fracture was produced by the impact of a bullet, and tracheotomy was successfully performed.

In the 'New York Medical Journal,' May, 1865, p. 110, Dr. Sands gives a history of a case of cancer of the larynx successfully removed by laryngotomy, and adds an analysis of 50 cases of tumour of the larynx treated by operation.

Dr. Sands' own case was of much interest. The patient was a woman, æt. 30. A polypoid growth had been seen springing from one side of the larynx, between the true and false vocal cords. It was sessile, and total removal from the mouth was impracticable, but a small portion was thus removed, and, on microscopical examination, was believed to be cancerous. The symptoms, as they are stated, were hoarseness, slight dyspnoea occasionally, and a feeling of constriction in the throat. The operation undertaken for the removal of this growth consisted in making an incision five inches in length, from above the hyoid bone to within two inches of the sternum, dissecting the larynx and trachea bare as low as the third ring of the trachea, the isthmus of the thyroid being divided for the purpose. When all bleeding had ceased, the trachea was opened at its upper part, and a tracheotomy tube introduced, having a long narrow slit along its upper wall, intended to permit the more easy passage of the knife in carrying the incision upwards. Then the cut was extended through the whole of the middle line of the larynx, as high as the os hyoides, dividing the base of the epiglottis. Considerable cough and spasm of the glottis followed this step of the operation, and some difficulty was experienced in preventing the passage of blood and other fluids into the lungs. At this time the patient also vomited, and the vomited matter ran down freely into the trachea. When she was again quiet the head was thrown well back, and the alæ of the thyroid cartilage separated with a pair of sharp hooks. The growth was then excised at the level of the vocal cords, which seemed healthy. As the tumour had a very large base, connected with the cartilage forming the floor of the ventricle, when as much as possible had been removed with scissors and forceps, the actual cautery was applied to the base. The wound was then closed by sutures, except the lower part, where a large double canula was kept in for five days. The wound closed, except a small fistulous track resulting from the division of a bursa over the hyoid bone, which finally healed under the use of nitrate of silver, and she recovered her voice in a great degree, though she never regained its natural tone. Examination with the laryngoscope showed

that the mobility of the vocal cords was much impaired, and the side operated on occupied by cicatricial tissue. She remained in good health for about a year and a half, and then began to exhibit symptoms of cancerous cachexia, but the organ affected could hardly be determined. She died 22 months after the operation. After death deposit was found in both supra-renal bodies, and in one kidney and ureter, which to the naked eye resembled scirrhus, whilst its microscopic characters were rather those of recurrent fibroid, presenting in this a great contrast to the original disease, which showed strongly marked the cell-elements of cancer. The larynx and trachea were healthy, except for the scar of the operation.

Dr. Sands appends two tables of reference to all the cases, 50 in number, of operations for tumours of the larynx which he could find on record. The first table comprises 11 cases in which the tumour was removed by external incision with the following results:

Of the 11 cases it is known that 9 recovered, 1 died, and 1 was expected to prove fatal.

Of the 9 that recovered, in 5 respiration through the larynx was re-established; in 4 the patients were obliged to wear the tube. In 1 the voice was normal, both before and after operation; in 2 the voice improved; in 6 the voice remained still hoarse. Four were known to have died at a later period of typhoid fever (6 months), of extension of disease into trachea (15 months), of gangrene of lung (2 years), and, Dr. Sands' own case, of cancer of supra-renal glands and kidneys (22 months). In 5 of the 11 cases the diagnosis was made with the laryngoscope. The results of this series of cases, as far as they go, are very favorable to operation by external incision.

Of 39 cases treated by operation through the mouth, which are given and referred to in the second table, 1 died, 38 recovered. In 35 respiration was normal after the operation. In 3 tracheotomy was performed, and the patients continued to wear the tube. In 12 cases the voice was restored, in 11 improved, in 2 unimproved, and in 13 the state of the voice is not mentioned. In all except 4 cases the diagnosis was made by means of the laryngoscope, and in all except 5 that instrument was used to guide the steps of the operation.

These data are very favorable to operations in such cases. It must be remembered that in most of the cases composing the first table the disease was so extensive that it could not be removed without a good deal of injury to the vocal cords, which accounts for the voice being seldom regained.

In choosing one or the other operation regard must be had to the following points:—1. *The situation and extent of the disease.*—If pedunculated, it can be removed from the mouth; otherwise not. In a doubtful case the operation from the mouth may be tried, and in the event of failure the larynx may be opened from without, as was done in one of the cases referred to. 2. *The nature of the disease.*—A firm fibrous tumour will require removal, while mere warty excrescences possess little vitality, and may be easily destroyed, either by caustics or instruments through the mouth, and often disappear of themselves, of which an instance is cited from the 'Wiener Wochenschrift,' 1863, p.

361. Cancerous tumours, he thinks, require external excision. 3. *The accessibility of the larynx and its degree of irritability.*—In some cases it is found impossible to guide instruments into the larynx after ever so patient a trial, with the assistance of the laryngoscope. Here external incision would be necessary. But even when not inaccessible, the larynx may be so irritable as to frustrate all attempts to complete the operation. In 2 of the cases in the table the patient suddenly became asphyxiated during the attempt, and the surgeon was obliged to resort to tracheotomy on the spot. In 1 of these cases the growths were subsequently removed through the upper aperture; in the other case the patient ran away, preferring to wear the tube in the trachea rather than encounter the risk of further operation.

In the 'Wiener Med. Wochenschrift,' June 28 and July 1, 1865, Dr. Gilewski, of Cracow, records a case in which he removed some polypous growths from the larynx, by an operation similar to that of Dr. Sands. The patient was a girl æt. 16, who had suffered from hoarseness and noisy breathing, especially at night. This depended on the presence of three polypous excrescences, as seen in the laryngoscope. The growths could not be removed from the mouth, on account of the violent reflex movements excited by the attempt and the narrowness of the opening. The operation was performed almost exactly as above described by Dr. Sands, but on exposing the interior of the larynx only one tumour was found. It was thought that the others had been incised during the opening of the larynx, and had collapsed. The operation was successful, and the patient recovered her voice. Dr. Gilewski believes that the operation would be very difficult in old persons, on account of the ossification of the cartilages, and would also involve danger from perichondritis, leading to suppuration of the cartilage. But where the parts are supple it is not difficult; the vocal cords escape injury if the larynx is fixed by a hook, while the division is made upwards in the middle line with a probe-pointed bistoury from the first cut in the air-tube. It is convenient that the patient should be conscious during the later stages of the operation, in case of bleeding.

Dr. Philip C. Smyly figures in the 'Dublin Quarterly Journal,' Feb. 1866, at p. 10, a forceps for fixing the larynx during laryngoscopy, of which he gives a short description. Its object is to dilate the upper opening of the larynx and raise the epiglottis. A forceps with broad bent blades is held between the thumb and the middle finger, while the index finger carries an ordinary faucial mirror, attached to it by an india-rubber nipple, like a thimble. By this contrivance Dr. Smyly was able to display the parts in a case of polypi in the larynx at the base of the epiglottis, in a patient who was tongue-tied and had a very large tongue, with an epiglottis that almost touched the back of the pharynx even during phonation, and the larynx very deeply set in the throat. The apparatus can only be understood by reference to the figure. In the same journal, p. 335, Dr. McDonnell relates a series of very interesting cases, illustrating the practical use of the laryngoscope. The first was that of a woman suffering from secondary syphilis, in whom there was great dyspnoea, but slight aphonia. The laryngoscope showed no ulceration of the vocal cords, but infiltration of the surrounding structures, whereby

the rima glottidis was contracted and the play of the arytenoid muscles hindered. She recovered under constitutional treatment and blisters. In the second case, one of phthisis laryngea, the patient, a man about 50, was nearly suffocated by a necrosed and loose piece of an ossified arytenoid cartilage, which was successfully extracted. A third case was a mucous cyst near the base of the epiglottis (somewhat like Mr. Durham's, in 'Med. Chir. Trans.,' xlvii, p. 7, but smaller), which was cured by laying it open and then touching it with nitrate of silver on a curved wire. The fourth case was that of an ulcer between the cornua of the arytenoid cartilage, apparently not syphilitic, giving rise to aphonia. This was cured by touching it with nitrate of silver and administering iodide of potassium in bark, with inhalation of a strong solution of sulphate of zinc pulverized.

At page 284 of the same volume a case is related in which a child *æt.* $3\frac{1}{2}$ was suddenly taken with symptoms of suffocation, which were thought to be caused by his being choked with a piece of cake which he was eating. Dr. Smyly was sent for when the child was dying. A soft spongy mass could be felt in the pharynx, and the finger then distinctly entered the larynx. The child had by this time "ceased to breathe for some minutes," there was no pulse, the eyes were glazed, and the face livid. A catheter, open at both ends, was passed into the larynx and down the trachea, and artificial respiration kept up through it; but it was not till after 20 minutes that the first signs of life were observed. After the child had quite rallied tracheotomy was performed. This was followed by alarming sinking, but he recovered from this condition, and breathed calmly for some hours; then convulsions set in, and he died 36 hours after admission. On post-mortem examination the cause of obstruction was found to be a mass of round worms, 6 in number, filling the upper part of the pharynx, and one of them lying in the glottis. There was no œdema. Dr. Smyly remarks on the ease with which the operation of "tubing" the larynx can be accomplished, and on the success which has attended it in M. Bouchut's practice, for which he refers to the 'Journal of Pract. Med. and Surg.,' 1st year, art. 5551 (English edition). He says that for this purpose he now always places one of Hutton's catheters in his case of instruments for tracheotomy.

See also in the 'Deutsche Klinik,' July 21, 1866, p. 262, the account by Dr. Merkel of Leipsic, of a case in which the patient recovered her voice almost immediately after the puncture of a cystic tumour attached to the vocal cord.

The following extracts refer to affections of the locomotive organs:

In the 'American Journal of the Medical Sciences,' July, 1865, p. 17, Dr. Liddell, Inspector, Medical and Hospital Department of the Army of the Potomac, contributes an article on "Contusion and Contused Wounds of Bone, with an account of 13 Cases."—Dr. Liddell remarks on the silence of systematic writers, both in general and military surgery, on the subject of these injuries, but quotes from Stromeyer an account of the effect of contusions by bullets in producing necrosis. Dr. Liddell proceeds to enumerate and describe in detail the effects of con-

tusion on bone. First, ecchymosis of the cancellous tissue of the bone, illustrated by a case in which the thigh was amputated, on account of implication of the knee-joint, 6 days after the wound. This ecchymosis may be reabsorbed without leading to any further consequences; but there is good reason, says Dr. Liddell, to believe that ecchymosis of bone is not always attended with so fortunate a result, but that the pressure of the effused blood arrests circulation in the vessels of the part, leading to necrosis, as by a process of dry gangrene. Of this event, also, a case is reported, which appeared to the author to be an instance of such a consequence following on a contusion of the femur from a bullet wound.

The second consequence is ecchymosis in the medullary tissue. This is illustrated by a case, in which simple longitudinal fissure of the fibula was produced by a gunshot contusion; and at the part struck the medullary canal was filled with extravasated blood, while above this the medulla was red with inflammatory congestion. In this case the existence of injury of one of the bones had been suspected, but not satisfactorily diagnosed, as the osseous tissue was not exposed, the periosteum not being removed by the injury.

The third consequence is simple osteo-myelitis, not accompanied or preceded by ecchymosis in the osseous tissue. This, again, is illustrated by a case in which a bullet struck the shaft of the femur, grazing and bruising it, after which an abscess formed about the seat of injury. There was a large deposit of new bone around the femur, new osseous tissue was deposited in the medullary canal, and the marrow presented the "red inflammatory appearance described by Virchow." The patient sank with typhoid symptoms, but no distinct evidence before or after death of pyæmia.

The fourth consequence is necrotic osteitis, or an inflammation of the bone, so severe in character as to terminate in necrosis; and the fifth is suppurative osteo-myelitis, leading usually to death by pyæmia. Each of these conditions is also illustrated from the writer's experience in the late war. Besides these there is the species of necrosis produced directly by the contusion without the intervention of either ecchymosis or osteo-myelitis. This is the form which seems to have attracted Stromeyer's attention, and is illustrated by a case of exfoliation of the cranium after a glance-wound from a bullet; another of exfoliation of the external malleolus; and a third, of exfoliation from the ilium after gunshot wounds. In contrast to these, a case of gunshot wound of the tibia without exfoliation is introduced, to show how slowly these wounds heal even when no bone is destroyed.

Finally, Dr. Liddell discusses the treatment appropriate to each of these conditions, as far as they can be diagnosed.

In the '*Gaz. des Hôp.*,' 1865, Nos. 145, 147, is the account of a discussion at the Soc. de Chir. de Paris on the subject of separation of the epiphyses. M. Dolbeau presented to the society a preparation in which the lower epiphysis of the radius had been separated on both sides, and on one side with separation of the epiphysis of the ulna also. The epiphysial cartilages had adhered to the separated epiphysis, together with a few lamellæ of bone from the shaft of the radius. The

child died from injury to the head. In the discussion which ensued an interesting case was mentioned by Richet, which occurred in the practice of Denonvilliers, in which the end of the shaft of the radius projected between the flexor tendons through the skin of the forearm, and could not be reduced. The projecting extremity was removed with a chain-saw, and the boy got well without a bad symptom. The resected bone was produced to the society, and showed its extremity covered with several thin lamellæ of epiphysial cartilage. M. Marjolin believed separations of the epiphyses to be extremely rare, and produced some details of fractures at the Hôpital Ste. Eugénie, which showed, at any rate, that they had been very rarely diagnosed at the hospital from which his statistics were drawn. M. Guersant also said that he had never been able to diagnose the injury with certainty, and M. Chassaignac expressed his opinion that true separation of the epiphysis hardly ever occurs. A small portion of the shaft almost always adheres to the epiphysial cartilage. M. Broca, however, reminded the society that the injury could easily be produced in the dead subject, and therefore was very probably more frequent in the living than was supposed. In experiments on the dead subject the cartilage was usually found attached to the epiphysis.

In the 'Annali Universali di Medicina,' 1866, vol. 196, p. 428, is related a case of osteo-aneurism, published by Sig. Cappelletti. The patient was a lady, born in 1816. The symptoms dated from 1853, when a little pain (which commenced suddenly while getting into bed, eight days after her ninth childbirth) was felt in the upper part of the right tibia, accompanied by a little crack just below the knee. Swelling followed, and after half a year was found to pulsate here and there. It is unnecessary to follow the case in detail. Suffice it to say, that the femoral artery was tied a year and a half after the first onset of the diseases, but the pulsation returned in five days. Secondary hæmorrhage came on on the seventeenth day, and the external iliac was tied. The patient recovered, but the tumour continued to grow, although the pulsations almost disappeared. Amputation was performed four years after the commencement of the disease. The operation was quite successful, and the patient was in excellent health seven years after amputation. All that is said as to the pathological anatomy of the tumour is, that it was almost exactly similar to the description by Scarpa, in p. 164 of his work on 'Aneurism.' Sig. Cappelletti concludes that osteo-aneurism has two stages—one of telangiectasis, and a second of laceration of the vessels and formation of an aneurismal sac. The ligature of the main artery of the limb he believes to be futile. In the first stage partial resection of the bone should be practised; and, in the second, amputation.

"Remarks upon Osteo-myelitis consequent upon Gunshot-wounds of the Upper and Lower Extremities, and especially upon the Treatment of Stumps affected with Osteo-myelitis after Amputation necessitated by such Injuries," by T. Longmore, Deputy Inspector-General, Professor of Military Surgery, Army Medical School ('Med.-Chir. Trans.,'

xlvi, p. 43).—Mr. Longmore, in this communication, treats of osteomyelitis rather in its chronic than in its acute form. On this subject he quoted with approbation Baron Larrey's conclusions on the existence and on the treatment of osteomyelitis following gunshot wounds, amputations, or other injury. Baron Larrey, though admitting the frequent occurrence of osteomyelitis in these cases, does not regard it as a necessarily incurable disease, nor does he regard disarticulation as universally necessary. Mr. Longmore carries this doctrine somewhat further. He cites cases in which the stump of an amputation of the arm has been disarticulated at the shoulder-joint (by himself as well as by other surgeons), and one in which the patient died exhausted, without any operation; and he compares these cases with others apparently similar, in which the stump has been restored to perfect usefulness, and the patient to good health, by the removal of all the portions of dead bone from the interior of the shaft. He points out that, in the total inflammation of the bone, to which the term in question is usually applied, though in the interior the inflammation will go on to the destruction of the part of the shaft involved, yet the inflammation of the periosteum will exist only to such a degree as to cause it to exert a protective influence, by the formation of new bone around the diseased tissues, just as in ordinary cases of necrosis; also, that the morbid condition of the endosteum does not usually extend from the shafts of bones into the apophyses; and that, though the articular extremities may have undergone the process of inflammatory softening and rarefaction, sometimes designated by the name of osteoporosis, there is no reason to doubt that this will subside on the removal of the dead bone. Hence he urges the propriety of making every effort to save such stumps, and to substitute an ordinary operation for necrosis for the disarticulation recommended by M. Jules Roux and other French military surgeons. During the period of sequestration the patient's powers may be severely taxed to resist the exhausting influence of the disease; but if this is survived, Mr. Longmore appears to believe that in almost every case the stump may be saved by the removal of sequestra.

Prof. Fayrer, in the 'Indian Annals of Medical Science,' Oct. 1865, speaks of acute osteomyelitis as a frequent cause of death after amputation or other injuries, or surgical operations involving section of bone. His observations are founded on 32 cases of amputation:—"They were 1 of the hip, 3 of the thigh, 10 of the leg, 4 of the ankle (Syme's), 5 at the shoulder-joint, 5 of the arm, and 4 of the forearm. Of these, 32 in all, 3 were secondary amputations [by which term we understand Prof. Fayrer to mean reamputations, *i. e.* removal of the stump of a previous amputation, though that is not the ordinary sense of the word]; and of the number, 14 lived, 15 died; of the deaths, 9 resulted from pyæmia the consequence of osteomyelitis, 3 from pyæmia not depending on bone-disease. There were six deaths from other causes, such as tetanus, gangrene, and exhaustion." Prof. Fayrer then refers to the well-known paper of M. Jules Roux, and to the success which attended his amputations through joints. He is not, however, disposed to admit that these exarticulations are in themselves superior to amputation above the

joint; for instance, he thinks that, "except in cases of endemic tendency to osteo-myelitis, section of the humerus or femur in their lower third is as good, if not a better operation, than disarticulation." Nor does he discuss the question raised in Mr. Longmore's paper referred to above:—"I have no intention of discussing the question of the general application of the term osteo-myelitis, in the wide sense in which it is given to the chronic form of disease by the French surgeons, and which involves a whole series of pathological changes in bone, in which the necessity of immediate amputation is, at all events, not concerned. But it is to the acute and diffusive, a sort of erysipelatous form, an analogue of diffuse suppuration in the areolar tissue, that I refer—a disease, so far as I have seen it, so extensive, as regards the bone it affects, that it causes its entire destruction, and speedily, if not removed, gives rise to that septic condition of the blood which results fatally in a large number of cases. . . . It is not the mere local mischief that one dreads. It is the constitutional disease to which it gives rise, and the consequent morbid condition of the blood, which is, I believe, if once thoroughly established, and not promptly dealt with, certain to entail fatal results. . . . The symptoms in the acute form generally make their appearance early—within a week or ten days—it may be earlier—after the operation, wound, or injury. The stump, wound, or contusion may have been doing well. It may, perhaps, have sloughed a little, and the sloughs have cleared away, healthy granulations having appeared. The flaps may have united, almost by first intention, at all but a point or two, whence discharge continues. The pain is not necessarily acute, and the tenderness on pressure of the stump is but slightly increased. The discharge becomes more profuse; but it is not healthy, well-elaborated pus. A probe being introduced, the bone is found dry and denuded, and if exposed the medulla will probably be found protruding like a fungus, while the periosteum is stripped from the end of the bone. With all this there may have been only a quickened pulse—a febrile condition at some time of the day, the temperature at others being at, or even below, the natural standard; rigors, as yet so slight as hardly to have attracted attention, may have occurred. Such are the early stage and symptoms, local and constitutional. These rapidly progress and develop themselves in the most marked manner; and it is here that the critical period has arrived when it is necessary to make a thorough examination, and decide the question whether it be osteo-myelitis or not. Exploration should be made with the finger, the stump, if necessary, being sufficiently reopened to admit of your doing so; and the condition of the bone should be most carefully examined and ascertained. In incipient cases the medulla will be found protruding like a fungus, and the bone surrounding it exposed to a greater or less extent. At a later period the end of the medulla is found already dead, blackened, and encrusted; but within it is a putrid mass of bone-*débris* and pus—a probe passing down the entire length of the shaft. In the former stage you can wait and watch progress; the mischief may be limited, and a ring of bone be thrown off; but in the latter case immediate interference is necessary, and nothing less than amputation, either at or above the next joint, will suffice. The constitutional symptoms

will also have indicated the necessity for interference, and they are the symptoms of pyæmia of a marked character."

After describing these symptoms, Prof. Fayrer goes on to the treatment of the disease. He insists on good hygienic conditions as preventive measures:—"The earlier the disease is recognised, the more likely is any treatment to be successful. When the pulse quickens and rigors occur—when the discharge begins to assume an ichorous and unhealthy character—when on examination the bone proves to be denuded of periosteum, and the medullary cavity filled with dead bone and pus—I am satisfied that the sooner amputation at or above the next joint is had recourse to, the better is the chance of saving the patient's life. The danger is of waiting too long—long enough for the blood-poison or the capillary embolism to have brought about changes in the viscera which are the precursors, if not the cause, of death. . . . The proper time for amputation (or removal of the affected bone) in osteomyelitis is not difficult to determine, for it should be as soon as possible after ascertaining that the bone is so affected; and, as I have said, the diagnosis is to be made by the constitutional and local symptoms, and by passing a probe into the medulla of the bone. Should it impinge on healthy *bleeding* medulla near the surface, you may, if the constitutional symptoms are not urgent, wait and see if nature will limit the suppuration, and throw off a ring of diseased bone. . . . The constitutional signs, the state of the pulse, respiration, and temperature, would be important indications of the patient's condition, and they cannot be too carefully studied. A pulse exceeding 120, persistent temperature above 104° , bronchial râles, hurried respiration, and tenderness over the hypochondria, are symptoms that should cause the greatest anxiety on their first appearance, and very speedily decide the fate of the patient or of his limb."

The paper concludes with notes of 4 cases, in one of which osteomyelitis attacked the ulna after the removal of a portion of that bone, with a tumour which grew from it. Amputation of the arm was performed, but the humerus was attacked with the same disease; the patient was too weak to bear reamputation, and died of pyæmia. The post-mortem appearances are carefully described. In the second case osteomyelitis attacked the femur after primary amputation of the thigh. Amputation at the hip-joint was performed on the 12th day, and the patient, a lad of 16 years of age, recovered. The two others are fatal cases of the disease after injury, to illustrate the course of the affection and its post-mortem appearances.

On this subject reference may be made to two cases of amputation at the hip, in osteomyelitis following on excision of the end of the femur, by the present compiler, in the 1st vol. of 'St. George's Hospital Reports,' pp. 151, 152.

In the 'New York Med. Journ.,' Dec. 1865, p. 161, Dr. Packard, of Philadelphia, relates a case somewhat similar to Dr. Fayrer's, in which the thigh had been amputated for the sequelæ of gunshot injury of the leg, Aug. 22, 1864. Secondary hæmorrhage occurred, and the femoral artery was tied in Scarpa's triangle Oct. 17. The end of the femur protruded through the soft parts, and 4 inches of it was resected

with the chain-saw. The stump, however, became enormously swollen and painful, with numerous abscesses, and necrosis of the femur as high as the trochanter. The thigh was amputated at the hip-joint Jan. 19, 1865. The patient was so depressed that he was not removed from the operating-table "for two or three days," lest the attempt at removal might prove fatal. Secondary hæmorrhage occurred, and the external iliac artery was tied on Jan. 27. The ligature came away on the 21st day, and 2 days afterwards the lower end of the artery poured forth blood furiously, and was only controlled with great difficulty by direct pressure, which was kept up for about 2 weeks. After this recovery was uninterrupted. Dr. Packard refers to a case published by Dr. Van Buren in his 'Contribution to Practical Surgery,' and 3 others referred to by that author; also to Dr. Fayrer's case. Besides these, performed, as it seems, on account of osteo-mylitis, Dr. Packard refers to 8 cases of successful amputation at the hip by American surgeons for miscellaneous causes, which are all the successful cases that he could find in that country, unless 2 operations, said to be done in the Southern army, are to be reckoned, which, however, Dr. Packard does not credit. He divides the cases in which the operation is admissible into (1) those in which the same thigh has been previously amputated; (2) those of chronic disease. "It would scarcely be fair to place cases of hip-joint disease in this class, although the first successful case in this city (Philadelphia) was of this character. It so often happens that the acetabulum is seriously involved, that in many cases no operation could be of any benefit." (3) Those in which an attempt has been made to save the limb after injury, and this operation becomes the only hope of the patient. (4) Those in which the desperate character of an injury recently inflicted renders death inevitable unless this slender chance is afforded. Dr. Packard seems to consider the first class of operations as the most successful and the most urgently indicated in appropriate cases.

[In reference to the remark in paragraph (2), 2 cases of successful amputation at the hip in morbus coxæ may be referred to, 1 by Mr. H. Lee, in 'St. George's Hospital Reports,' i, p. 147, and the other by Mr. Curling, in the 'London Hospital Reports,' iii, p. 214.]

"Remarks on the Pathological Anatomy of Osteo-mylitis, with cases." By H. Allen, M.D., Assist.-Surgeon, U. S. A. ('American Journal of the Medical Sciences,' Jan. 1865, p. 30).—Dr. Allen divides cases of osteo-mylitis after injury (of which the late civil war has furnished him with numerous examples) into—1. Those cases in which the affected bone has not been touched, but becomes secondarily involved by diseased action in the soft parts; and 2, those in which the affected bone has been primarily injured by a missile. The first section is further divided into cases originating from simple flesh wounds in the vicinity of the affected bone, and those subsequent to injuries received some distance from the seat of the osteo-mylitis. The number of cases recorded in this section is 8. All were fatal, but in each there was a sufficient cause of death in other injuries, so that it was difficult to say what share the osteo-mylitis had had in producing death. In no case was any symptom observed which led to the

diagnosis of the inflammation. In every specimen examined the periosteum was healthy, and in only one case was there any inflammation of the shell of the bone. The extent of inflammation in the medullary tissue bore no proportion to the degree of injury in the soft parts around it. The inflammation was uniformly present in the cancellated structure at the head of the bone, and the degree of its severity was proportionate to its extent thence along the axis. In every specimen the affected tissue was of a very firm consistency, so that if a section of it were removed it would retain the shape of the medullary cavity. The colour varied from a deep crimson to a dusky chocolate red, passing off into the healthy tissues by delicate shades of red and orange. In some specimens the pale or slightly coloured medulla appeared between patches of intense red, and occasionally spots of inflammation would extend downward along the wall of the cavity, thus giving the section an irregular and variegated appearance.

Dr. Allen puts the following questions:—May not this form of medullitis frequently occur in cases of wounds that eventually recover? Or, would it be going too far to affirm that moderate medullitis at the head of a long bone always follows a gunshot wound in the soft parts of the vicinity?

In contrast to these cases Dr. Allen relates 15 belonging to the second class, viz., those in which the affected bone had been primarily injured by a missile. These are again subdivided into cases in which amputation had been performed—those in which the limb was treated conservatively after gunshot fracture, and those of simple graze wounds of the bones. In 4 of the 8 cases in which amputation was performed the inflammation had passed on to suppuration, also in 1 of the 4 cases treated conservatively, and in 4 of the 5 cases of graze wound of the bone. The periosteum was only occasionally found detached. Dr. Allen remarks, as a curious circumstance that, while in all cases that he has examined in which the humerus or femur was affected, the inflammation proceeded downwards from the head of the bone, in the only case of osteo-myelitis of the tibia which he had examined the progress of the disease was from below. He also remarks on the grave consequences which may ensue even in the simplest form of gunshot wound when a bone has been grazed, and on the probability that many deaths after battle, recorded as due to "pyæmia," "diarrhœa," "exhaustion," &c., may really be cases of osteo-myelitis. In none of the cases recorded by Dr. Allen had any complication of the interior of the bone been even suspected by the attending surgeons.

The cases presented great variety in their symptoms—some having prominent symptoms of pyæmia, others not; but in none were there any symptoms pointing to the medulla. In case the suppuration were suspected during life Dr. Allen rather inclines to recommend trephining.

The exact relation between osteo-myelitis and pyæmia Dr. Allen regards as uncertain. In only 7 out of his 23 cases were secondary deposits found, although there were symptoms of pyæmia in others.

These Dr. Allen classes as "pyæmoid." In 8 cases he asserts the absence of pyæmia.

Along with Dr. Allen's paper some cases of osteo-myelitis after amputations and wounds of bone by Dr. Gibbons may be consulted. They are quoted in the 'New York Med. Journ.,' April, 1866, p. 70, from the 'Pacific Med. and Surg. Journ.,' Feb. 1866.

In the 'Pathological Transactions,' xvii, p. 243, is the description, accompanied by accurate representations, of a very peculiar hypertrophic disease of the cranial bones, hyoid bone, and fibula, from a man who had been a patient of Mr. Bickersteth, of Liverpool, for several years, and who died at the age of 37. The bones of the face had begun to swell when he was 14 years of age, but it was not till 13 years afterwards that a similar swelling was observed to commence in the left fibula. For about 2 years before his death he began to suffer from severe pain both in the legs and head, and the cavities of the mouth and orbits became greatly lessened by the growth of their bony walls, so that the eyeballs were thrust out of the head, and a frightful expression given to the countenance. The sight of one eye was lost; the other senses, intellect, mastication, and deglutition, were unaffected; but he died worn out by emaciation from protracted suffering. The viscera, as far as examined, were healthy. The disease consists in enormous enlargement of all the cranial bones (except the occipital, which is remarkably exempt from hypertrophy) and the facial bones, particularly the malar and inferior maxillary, as well as the hyoid bone. The malar bones form swellings as large as an orange on each cheek,* nearly meeting the frontal, and reducing the orbits to mere chinks; and the lower jaw is also enormously enlarged. The whole of the outer surface of the skull is very vascular, but the inner seems only slightly affected. The fibula is so enormously enlarged that an accurate tracing of its section almost fills the (octavo) page of the volume, measuring $5\frac{1}{2}$ inches by $4\frac{3}{4}$. Accurate measurements of the various affected bones are given. In a report on the case by Dr. Murchison and Messrs. De Morgan and Hulke it is noticed that there are two somewhat similar specimens in the Hunterian Museum—one the skull of a Peruvian, in which many of the bones are enlarged, similarly but not to so great an extent as in the present case; and the other, a case in which the malar, orbital, and nasal bones bear a striking resemblance both in external and microscopic appearances to the present. These are accurately described in the report. The enlargement consists of a dense mass of ivory-like bone, with here and there an extremely delicate cancellous structure, springing from the surface of the original bone, which appears considerably expanded, and presents a thin shell, enclosing a very open cancellated tissue. The microscopic arrangement of the Haversian canals varies much from the natural condition. No opinion is expressed as to the essential nature of the disease, except that it was neither

* One very remarkable circumstance is noted about the diseased parts. So far was there from being any tendency to ankylosis, that these globular masses became separated from the malar bones during the process of maceration. Nor was there any suppuration during the whole course of the disease.

syphilitic nor cancerous, nor, indeed, the result of any known constitutional cachexia.

Dr. Duka describes, in the 'Path. Soc. Trans.,' xvii, 256, a very peculiar and interesting form of bony tumour. The tumour, which was about as large as a middle-sized potato, with a nipple-shaped projection in one part, is represented of its natural size in Dr. Duka's paper. It consisted of compact, ivory-like, bony structure, and lay loose in the antrum of Highmore. The nipple-shaped projection was so wedged in by the nasal process that the mass could not be removed till a portion of the palatine process of the superior maxillary bone had been removed. At the tip of the nipple-like projection was a large hole, perforating its base, and filled with a polypoid structure. The tumour, projecting into the nose, and covered by soft parts, at first sight resembled an ordinary polypus; then, as some hard movable mass was felt behind, necrosis of some of the facial bones was suspected. The tumour had, in all probability, sprung from one of the bones of the upper jaw, being attached by the nipple-like projection. This having given way from some accidental cause, the mass had become loose. The microscopic characters of Dr. Duka's tumour are described in a report appended to the account. They were those of true bone, but somewhat different from its natural appearance. Dr. Duka refers to a case, published by M. Michon, in the 2nd vol. of the 'Mémoires de la Société de Chirurgie de Paris,' of a tumour of precisely the same characters both to the eye and microscope, and which was also successfully removed by excising a portion of the upper jaw, after an operation lasting more than an hour. There, however, the tumour had still retained its connection to the orbital plate of the superior maxillary and vomer. The peculiar nature, pedunculated shape, and perfect detachment of the tumour, form the characters which give its surgical interest to this singular case.

The following notes refer to the subject of subperiosteal resections of whole bones, or of portions of their shafts:

The properties of the periosteum in the regeneration of bone after its death or removal have been long studied and appreciated. They have recently been presented in a still more striking light by the ingenious experiments of M. Ollier, and thus a great impetus has been given to subperiosteal operations. Abroad, especially, many attempts have been made to take advantage of the properties of the periosteum, by removing diseased or injured bone, and leaving the periosteum in its place to supply a substitute for the bone which has been removed. In this country, also, similar attempts have, indeed, been made, but the cases are not numerous, and very few have been published. The subject is therefore as yet somewhat new to English surgeons, and it has accordingly been thought that a few remarks on the general question, with notes of the published cases, might be useful in this place.

Let us, in the first place, have an accurate idea of the sense in which the term "subperiosteal resection" is to be employed. When a piece of bone has perished, and has separated as a sequestrum, and is lying enclosed in a case of bone furnished by the periosteum, its removal or

resection, is in one sense subperiosteal, for the periosteum and the periosteal sheath are left behind almost entire. So also when a loose fragment of bone is extracted from a comminuted fracture, as is done so often in compound fractures of the skull, the operation might be designated as "subperiosteal extraction," without any violation of grammatical accuracy. Some cases may be found so reported, in which by the use of a novel term an air of novelty has been given to a very familiar proceeding. It is not, however, in this sense that the word should be employed. It should be restricted to those cases in which the bone, previous to the operation, retains its natural position and its natural connections (at least to a great extent), and in which the periosteal sheath has not yet been formed. In such cases, after the removal of the whole thickness of the diseased or injured bone for a certain portion of its length, the parts left behind are held together only by the periosteum and the adjacent soft parts.

The cases in which this operation is possible appear to be the following :*

1. Recent injury—compound comminuted fracture.
2. Old injury—ununited fracture.
3. Resections of joints.
4. Caries, necrosis, or other disease, of the whole thickness of the bone.
5. Subperiosteal abscess, or diffuse periostitis.
6. In plastic surgery, as in Mr. Jordan's proposed operation for ununited fracture. Langenbeck's method of rhinoplasty, with transplantation of the periosteum, though not in strict terms a resection, is so analogous to this that it may be mentioned at the same time.

In cases of recent injury it is not often that the whole thickness of the shaft of the injured bone from beneath its periosteal envelope is either feasible or desirable. The following case is an example of this class.

"A case of Sub-periosteal Resection from the Shaft of the Tibia and Fibula," by Langenbeck (*Berliner Klin. Wochenschrift*, Jan. 23, 1865, p. 31).—The patient was a soldier, who had been wounded by a musket-ball on April 18, 1864. The bullet passed in, at the middle of the leg, from a very short distance (the result of accidental discharge of the musket of one of his own comrades), and splintered the bones extensively. The parts were put in position, and ice was sedulously used, with general antiphlogistic regimen; but fever and œdema of the limb increased, in spite of incisions and the extraction of sequestra, until the swelling reached the middle of the thigh. The circumstances seemed very unfavorable for amputation of the thigh, so that Herr Langenbeck proceeded to extirpate the injured bones thirteen days after the injury (May 1), by making a longitudinal incision on the injured tibia, which was split longitudinally, freeing it carefully from periosteum, sawing it through above and below, and taking away about four inches of the whole thickness of the bone; the fingers then penetrated into a large cavity containing foul pus, lacerated soft parts, and splintered

* The cases in which subperiosteal resection of a bone is undertaken in order to obtain access to the parts beneath it are not reckoned here. Langenbeck's operation on the upper jaw is somewhat of this nature, but can hardly be accurately designated resection, since the divided bone is restored to its former position.

fragments of bone. The splinters, were removed, care being taken to separate, cleanly, those which were not quite isolated, from the soft parts and periosteum. At last a piece of the whole thickness of the fibula, an inch in length, was removed. A plaster of Paris splint was applied, though with great difficulty, in consequence of the mobility of the parts; four holes were cut in it, corresponding to the incisions, which were kept open with oiled lint. The traumatic fever was much lessened by the operation; but new abscesses formed, and the splint had to be removed, and the limb put up in a fracture-box. The patient suffered so much, however, from pain on motion, that the plaster of Paris apparatus was resumed, being removed from time to time as it became necessary. The patient had previously suffered from hæmatemesis, and this recurred twice after the operation, and nearly proved fatal. Notwithstanding this complication, the wounds were all perfectly healed by the end of August, and in October the limb had acquired sufficient solidity to enable the patient to go on crutches. On January 10, 1865, the patient was exhibited to the Medical Society of Berlin, together with the portion of bone removed. The limb was shortened $1\frac{3}{4}$ in., the bone removed was replaced by a mass of bone, exceeding the natural thickness of the tibia; there was a dubious trace of flexibility in the middle of the part operated on. The patient had left off his crutches, and could walk a mile without difficulty, wearing a high-heeled shoe.

Dr. Lücke, professor of surgery in Berne, has also contributed a case of the same nature, but hardly so illustrative of this part of the subject, in his 'Aphorisms of Military Surgery from the Practice of the Second Schleswig-Holstein War,' p. 126.

"Gunshot-wound of the Tibia; resection."—A soldier had shot himself one and a half inch above the internal malleolus of the right tibia. The ball was not found. The fracture of the tibia was comminuted, and some small splinters were removed at the time. The fibula was simply fractured. A fenestrated plaster splint was applied; when he was first seen, in May [the date of the injury is not given], the wound was healthy, and a small portion of necrosed bone was felt exposed. As the wound would not heal, and the exposed surface of the bone became larger, the apparatus was removed (when the fracture was found to be healed), chloroform was given, a long incision made, and the injured parts laid bare. A large piece of necrosed bone was found, continuous above with the sound bone, and below imbedded in new formations from the periosteum. The periosteum was separated by means of an elevator, and the bone removed with the keyhole saw; in doing which it became clear that it was already in great part loose. It was two inches in length, and comprised the whole thickness of the tibia. The fracture was thus reproduced, for the thin plates of new bone were insufficient to hold the bone together. The fenestrated plaster of Paris splint was reapplied. In the beginning of July the wound was much contracted, and an extensive reproduction of bone could be felt. In the beginning of November the patient was seen walking as well as a sound man, and it seemed as if the tibia at the seat of operation was even stronger than before.

This case is not quite so illustrative of our subject, since it is clear that the necrosed bone, if not entirely separated as a sequestrum, at any rate was so to a very great extent, and that the operation had been preceded by considerable reproduction of bone. The value of the case is greatly diminished by the absence of dates and precise measurements.

Dr. Neudörfer, an Austrian surgeon, who served in the same war, has also communicated some notes of his practice to the sixth volume of 'Langenbeck's Archives' (p. 496), in which he mentions that he has had twelve cases of resection from the shafts of long bones, which have recovered; and that in none of these did reproduction fail to ensue, nor in any of them was a false joint left. He says, however, that in none of his cases, in spite of the most careful preservation of the periosteum, did the regenerated bone reach either the length or the circumference of the original, but seemed, as it were, to resemble a younger stage of it; and so there was in some [all?] cases more or less shortening of the limb. Precise notes as to time of operation are wanting. The author says in general terms that he always put off the operation as long as he could.

As this surgeon is the one who has, perhaps, had most experience in this matter, it may be interesting to have his opinion on the indications for it, and his directions for performing it.

On the first head Dr. Neudörfer says, "In the first place, the most important indication was profuse suppuration, threatening life, as well as acute local pain, resisting opiates and other means, but in which resection often succeeded in getting rid of this, by enabling us to find large, angular, dead fragments sticking into the deep parts. Finally, I may add, great deformity, threatening loss of function, and not to be got rid of without operation, as from large osteophytic productions around the fracture, and obstinate bleeding from the bottom of the wound.

"In performing the operation a long incision is to be made directly on to the bone, through the periosteum as well as the soft parts. The periosteum is then to be carefully pushed back from the bone with a raspatory (an instrument resembling that used for detaching the soft parts from the bone in the operation for cleft of the hard palate), and the bone is to be divided with a keyhole saw."

In all these cases the resection was a secondary operation, and was undertaken as a conservative measure, to avoid the necessity of secondary amputation. We have not met with any case of primary resection of the splintered bone, nor can such a proceeding be usually justifiable.

It appears from these cases that there are some instances of recent injury in which secondary amputation may be obviated, and a useful limb preserved, by the subperiosteal resection of a portion of the shaft of the injured bone. These cases occur chiefly in military practice, where the injury to the bone greatly exceeds in extent that to the soft parts, and where the operation gives opportunity for extracting splinters and fragments, or perhaps foreign bodies, which would otherwise remain as permanent sources of irritation. In civil life the opportunity of putting this operation in practice for injury must be rare.

Subperiosteal resection of joints is favorably spoken of by the German

surgeons. Langenbeck and his pupils appear to be very careful in excising the joints of the upper extremity, after gunshot injury, to preserve the periosteum. Thus, Lücke says, "In all the resections we have endeavoured to preserve the periosteum as far as possible. In secondary operations it is easy to do this, since the periosteum has experienced, according to the stage of the disease, either a considerable infiltration or a plastic thickening, and therefore does not adhere so firmly to the bone. In the stage of chronic inflammation it is more difficult to preserve the periosteum, on account of the thick fibrous membranes of different character which have formed over it.

"It has been questioned whether we shall eventually be able to separate the periosteum in primary operations, and, if so, whether the same osteo-plastic force will be found to reside in the periosteum as at the period when the formation of tissue, or rather of cells, has commenced in it.

"It is indubitable that it is much more difficult to separate healthy periosteum from healthy bone, both on the diaphyses and the epiphyses. In removing loose fragments, which were hanging by thin bridges of periosteum, I have taken great pains to leave the periosteum, and have often succeeded, even on the day after the injury, in stripping it off with my finger-nail, but still better with an elevator or raspator. In resections the same may be done.

"But whether the membrane, thus stripped off a fragment and left behind in a suppurating cavity, contributes anything towards the reproduction of bone, is more than I can say. I have plenty of evidence of a negative result in this experiment, but none of a positive result, from causes which may easily be imagined. It is quite otherwise in resection. Here we have all seen excellent reproductions of masses of bone, even in primary resections, and we have surely far more motive for preserving the periosteum in such cases than in cases of diseases of the bones, where the periosteum is often also implicated, and if left behind gives origin to new alterations of tissue, and protracts the cure in *infinitum*. We find after resection of the elbow, when recovery has occurred with preservation of motion, and also for the most part in the shoulder, a certain grade of new formation of bone. And such formation is desirable, if we would obtain a joint which is firmly movable, and not flail-like."—Op. cit., pp. 140-142.

It seems as if Lücke is here speaking of cases in which splintering has proceeded to some distance from the end of the bone, so that it has been necessary to remove a good deal of the latter.

Lücke gives (p. 143) the details of two cases of resection of the elbow (which, though it is not expressly so stated, were, it is to be presumed, subperiosteal) in order to show the good results of treatment by the plaster of Paris apparatus.

Mr. Stokes has also given a case in the 'Dublin Quarterly Journal of Medical Science,' May, 1865, p. 265, in which he excised the elbow about four months after some injury, the nature of which was not clearly diagnosed; but which was followed by loss of the functions of the joint, and commencing caries of the bones.

Mr. Stokes says, "A long straight incision, beginning about an inch

and a half above the olecranon, and carried to about the same distance below it, was made along the ulnar side of the olecranon. I then turned the edge of the knife from me, and directed the point of the instrument deeply to the bottom of the olecranon fossa, dividing all the soft parts down to the bone, following the line of the original incision. When the soft parts were dissected off as far as the edges of the bone, I commenced raising the periosteal envelope by the two elevators which are here delineated (see the original). The elevation was comparatively easy where it was situated over the diseased portion of the bone, for in this situation it was thickened and loose; over the sound bone it was a matter of much greater difficulty. Having succeeded in getting off two broad strips of the membrane, one over each side of the line of the original incision, I completed the operation in the usual manner."

The case did very well, and a drawing is given to show the extent of motion obtained $3\frac{1}{2}$ months after the operation.

Mr. Stokes lays great stress on these four points in excision of the elbow:—1. The adoption of the long vertical incision of Park. 2. The preservation of the periosteum. 3. Treatment of the wound by the continual bath. 4. Gradual flexion and extension of the forearm during the convalescence.

Subperiosteal resection may also be resorted to in caries or necrosis of long bones. The case above quoted from Lücke, of resection from the shaft of the tibia, was undertaken on account of necrosis. The following case appears to have been an instance of subperiosteal resection for caries:

Subperiosteal resection of the upper half of the humerus, followed by reproduction of the part removed. (By M. Ollier, presented to the Académie des Sciences by M. Velpeau.) '*Gazette Médicale de Paris*,' May 6, 1865, p. 276.—The operation was performed by M. Ollier at Lyons, Sept. 16, 1864. The patient was a girl 15 years of age, and had had old disease of various bones, besides pain about the shoulder for 8 years, and there were numerous sinuses. The symptoms before the operation are not accurately stated. An operation was undertaken in order to remove the head of the humerus, and a small part, perhaps, of the bone in the neighbourhood, but the disease was found more extensive than had been expected. The head of the humerus was altered in shape, and covered with diseased cartilage. The shaft was irregularly ulcerated, and scattered over with osteophytic productions. The muscles were separated from the bone by the suppuration. The periosteum was thickened and normally adherent to the bone. It was carefully detached, so as to leave a periosteal tube, continuous in its length, but interrupted in its circumference. No muscles or tendons were divided, a point which M. Ollier considers as important. A longitudinal incision was made between the fibres of the deltoid, and the tendons were detached from the tuberosities by means of a '*sonde-rugine*' (apparently some form of rasp). The bone was living and vascular. Its length was about 4 inches, just half the length of the entire bone.

At the date of the report, April 17, 1865, the bone had been reproduced, with a shortening of only half an inch. The shaft could be clearly followed for more than 2 inches of the part removed, as a hard

bony cylinder. The condition of the bone beneath the glenoid cavity could not be exactly ascertained, but the rounded shape of the shoulder was restored. The movements of the arm were considerable, so that she could put the hand to the head, dress herself, separate the elbow from the side more than 3 inches, and project the hand to a distance of a foot and a half, drawing it back with almost as much force as on the sound side. Movements of rotation were already perceptible. It is not said whether the wound was healed.

In his remarks on this case M. Ollier dwells on the importance of preserving the muscles and tendons in their natural connection with the periosteal sheath, in order to avoid their retraction and their assuming new relations. Thus, even if regeneration fails, the ultimate result will be more satisfactory than in operations after the usual method.

In the case related M. Ollier expects that the regeneration will eventually be even more complete; but, as it is, he advances it as a proof that in men, as in animals, the bone may be entirely regenerated from the periosteum; and he asserts that in some parts of the limbs this regeneration may be expected to be even more perfect in the human species, inasmuch as men can tolerate the necessary apparatus, which animals cannot.

A case is reported by Dr. Cutter, in the 'American Journal of the Medical Sciences,' Jan. 1866, p. 142, in which six inches of the tibia were removed on account of hospital gangrene following on gunshot wound. The wound had originally perforated the tibia without fracturing it. The report of the case is so loosely worded, that it is hardly possible to be certain about the following important particulars:—1. The operation, according to the dates given, was done 3 months and a half after the injury; but this is rendered uncertain by the statement, dated the day of operation, that "patient has gained greatly in strength during the last few months," leading to the suspicion of misprint in one of the dates of the years. 2. The piece of bone removed is not described; but it is left to be inferred that it comprised the whole thickness of the bone (the words are, "it measured six inches in length, *the size of* the entire tibia). 3. The amount of reparation is only described by the terms "an involucrum"—a "thin shell of bone." 4. It is not stated whether the bone removed was still fixed, or was separated. The latter would almost be inferred from the following expression:—"Four inches of the tibia [were] uncovered and protruding from the granulations." Still, though obscurely worded, the case may probably be taken as one of subperiosteal resection.

The 'Gazette Médicale de Paris,' Feb. 4, 1865, contains a review, by Dr. Sarazin, of Strasbourg, of a Spanish work by Dr. D. Juan Creus-y-Manzo on subperiosteal resection. The general physiological and surgical conclusions of this author, as to the functions of the periosteum in health and after operation, as stated by his reviewer, we do not think it necessary to reproduce, since they merely embody the usual opinions on the subject. Two observations, on which both the author and reviewer lay much stress, are the following:—"The more the periosteum has suffered, the less complete and regular the reproduction will

be; and when the periosteum has been destroyed the regeneration is inconstant, incomplete, and irregular." These facts, says the reviewer, are of a nature to damp the enthusiasm of those who will reflect a little. Is it not difficult to dissect the periosteum from the bone without injuring it? Is it not to be apprehended that, if left at the bottom of a suppurating cavity, it will perish, as in Desgranges' case, reported to the Medical Congress at Lyons ('Gaz. Méd. de Lyon,' Dec. 1864). Besides this, it must be recollected that in sick men the same results cannot be anticipated as in healthy animals, and that in general, in an adult animal (especially if diseased), the regeneration of bone by the periosteum may be slow, irregular, incomplete, and even entirely absent.

The first and second parts of M. Creus's work being given to the physiological and surgical theory of the matter, the third treats of the results obtained in practice. M. Creus is (says his reviewer) a partisan of the method, and is disposed to accept all the alleged facts, even those published by Larghi, of the resection of the ilium, followed by its reproduction in four months, and of the formation of a new caput humeri in two months. Still, he occasionally complains of the want of details; and several of the cases published in France deserve, says M. Sarazin, a more severe judgment. Thus he speaks with evident incredulity of a well-known case of alleged subperiosteal resection of the lower jaw, in which the teeth were said to be left floating, and attached only to the gums, and to have afterwards become fixed and encrusted by a new alveolar process (alluding, probably, to Maisonneuve, 'Clin. Chir.,' i, p. 616). In this, as in many other cases, M. Sarazin believes the proceeding to have been no more than the ordinary removal of a sequestrum.

M. Creus has collected 44 cases—two in his own practice—of one of which the chief points are here given. The patient was a man 29 years of age, affected with "ulcerating osteitis" of the left tibia. The periosteum was separated, and a portion of the shaft removed, which measured 16 centimètres behind and 19 in front. "A new bone was developed between June 10 (the date of operation) and Dec. 31; but further disease in the old bone showed itself, more operations were required to chisel away the diseased part, and it was not till 2 years after the original operation that the wounds were completely healed. There is no distinct account here of the length of the new bone. All that is said is that there was some lameness from too great laxity of the knee-joint. M. Sarazin believes, however, that the real disease in this case was acute periostitis, and that the bone which was removed would have come away of itself, with more rapid and probably more regular reproduction, although, he says, the reproduction actually obtained leaves little to desire. M. Sarazin also calls attention to the fact that in all probability the whole diseased tissue was not removed, and the operation was obliged to be completed by the method of "évidement" recommended by M. Sédillot, for which M. Sarazin professes a general preference over the method of subperiosteal resection, mainly on account of the less damage to the periosteum and the muscles, which he believes to be inflicted in the operation of "évidement," or "scooping out" of the bone.

The following are miscellaneous cases bearing on the subject:—
 “Excision of nearly the whole of the Ulna; reproduction of bone.” By J. K. Weist, M.D. (*Cincinnati Lancet and Observer*, March, 1866, quoted in the *New York Med. Journal*, April, 1866).

Col. C—received, Oct. 27, 1864, a gunshot wound in the left arm. The ball, entering on the inside of the forearm, about 2 inches above the wrist-joint, and, passing upwards, made its exit on the outside, about 3 inches below the point of the olecranon, badly breaking up the ulna in its passage, leaving, however, both of its articulations intact. Two days after the receipt of the injury it was deemed advisable to remove the broken fragments of the ulna by an operation. This was done by making an incision down to the bone, extending from the wound of entrance to that of exit. Many fragments of bone were removed, which, together, made up almost the entire bone, there only being left behind about $2\frac{1}{2}$ inches of the upper and 1 inch of the lower end. The broken ends of the portions of the bone left behind were smoothly sawn off. Although the periosteum in this case was much lacerated and torn, it was carefully separated from each fragment removed, and its connections as little disturbed as possible. After the operation the arm was placed upon a splint, and the wound treated in the usual manner. And although this officer was unavoidably placed under bad hygienic influence in general hospital, where considerable sloughing and secondary hæmorrhage occurred, greatly protracting the cure, the final result was highly satisfactory, as the lost bone was reproduced; and when I had the pleasure of examining the arm last October, just 1 year after the operation, all of its functions had been regained, with the exception of a slight loss of power to rotate the arm. The new ulna, though not quite so symmetrical, seemed to have all the solidity and value of the one in the uninjured arm.

“Excision of $2\frac{1}{2}$ inches of the Tibia.” By Dr. Kempster (*American Journal of the Medical Sciences*, Jan. 1866, p. 279).—In this case the leg had been shattered by a musket-ball, and the posterior tibial artery was thought to have been wounded. Twelve days after the injury it was decided to amputate, but the patient would not submit. The broken bone was, therefore, removed Oct. 31, 1864, through an incision 4 inches long, on to the spine of the tibia down to the bone. The upper and lower ends of the tibia were cut smooth with Liston’s forceps. The gap was about $2\frac{1}{2}$ inches long. The leg was put up in an easy position on pillows. It is not absolutely asserted that the periosteum was spared, but it seems to be implied. No further mention being made of the supposed wound of the artery, it may be presumed that the vessel was not really injured. In two months after the operation (Dec. 30) the gap was filled up by a hard mass, which no longer allowed of any motion of the fragments, and the patient was allowed to leave his bed. On the following March he was able to put his foot to the ground; in May he could walk short distances. Nothing is said as to shortening of the limb. Dr. Kempster concludes:—“It is a source of disappointment that we had not tried this operation before, believing that some useful limbs might have been saved; but having heard the operation of exsection of the lower extremities denounced *in toto* by our seniors, it

is not surprising that we also should entertain similar views, until compelled to relinquish them by force of circumstances."

"Subperiosteal Resection" ('New York Medical Journal,' April, 1865, p. 48).—Dr. Conant removed a portion of the tibia from a boy 7 years of age, 3 hours after a railway accident. The portion of bone removed, $3\frac{1}{8}$ inches in length, was lying loose in the wound. The fibula was also fractured and strongly bowed outwards, one fragment being thrust through the skin. The part removed involved about one third of the length of the bone; but the boy made a good recovery, and new bone was regenerated by the periosteum, so that only $\frac{1}{2}$ an inch of shortening remained. The treatment consisted in steadying the limb with sand-bags at first, then a fracture-box, with moderate extension afterwards by means of the weight and pulley.

Reference may be made to the 'Lancet,' March 31, 1866, for a case in which the present compiler removed the whole diaphysis of the tibia at the commencement of an attack of acute periosteal abscess; also to two cases of injury of the hand and forearm, by Dr. Larghi of Vercelli ('Omodei Ann. Univ. di Med.,' 1866, vol. 196, p. 541).

"Excision of $8\frac{1}{2}$ inches of Tibia; recovery."—Dr. W. P. Moon, of Philadelphia, relates the case of J. S—, æt. 39, who was admitted to hospital on July 22, 1864, for gunshot wound of the right leg, received at the battle of Petersburg. A minie-ball entered the upper third of the outside of the right leg, passing downward obliquely through the spine of the tibia, at middle third, carrying away a small portion of the bone, and emerging at the inner side of the leg. The injury to the bone, though *apparently* slight, proved to be one of those contusions which destroy the vitality of the tissues to a considerable extent, and eventuate in a large amount of necrosis. Sloughing of the soft parts, first in the track of the wound, and then of the bones, supervened. The slough of the bone also extended, until two thirds of the tibia became involved in its entire circumference. Abscesses formed constantly, which required to be opened. Active inflammation subsiding, it was decided, on Oct. 24, 1864, to remove the sequestrum, which proved to be $8\frac{1}{2}$ inches in length, from the epiphysis of the ankle-joint. The periosteum being in a measure loose and quite easily detached, the posterior portion of it was left in the entire extent of the shaft. An incision along the spine of the tibia, exposing 9 or 10 inches of the bone, was made, when it was readily removed by means of bone forceps. Dry dressings were used after the operation. The hæmorrhage, being trifling, was easily controlled. Nourishing diet with tonic treatment was continued, as before the operation. The soft parts, which had had an unnatural congested appearance, from this time took on healthy action, and the case progressed rapidly and favorably, new bone forming the whole length of the periosteum which was left in the wound. On December 8 healthy granulations throughout were filling up from the bottom with new bone. The patient was able to be about the ward on crutches. On Jan. 19, 1865, being very anxious to go home, he was discharged. On May 10, 1865, he wrote, "I am at work at my trade, coach-building, and have complete use of my injured leg, running up and down stairs as well as any of the workmen. The wound has entirely healed, and new bone formed throughout. I still wear my artificial support." Another case,

in which Dr. Moon removed $5\frac{1}{2}$ inches of tibia, on November 7, 1865, under similar circumstances, resulted in a like cure ('British Medical Journal,' Sept. 22, 1866).

The following extracts exhibit some of the objections which have been urged against these operations:

A case is reported in the 'Congrès Méd. de France à Lyon,' 1865, p. 273, in which the lower portion of the tibia (an extent of 10 centimètres = $3\frac{1}{2}$ inches, as well as can be judged from the account) was extracted, leaving the ankle-joint freely open, and the astragalus exposed. The operator was M. Aubert, of Mâcon. The patient, a young man of 21, recovered. The periosteum, which was thick and inflamed, was easily detached, the bone divided by a chain-saw, and the leg kept in a gutter splint. There was some shortening on his recovery, but the exact lengths are not given. There was some slight motion in the foot. The man could walk long distances, and dance for hours together.

This case is followed by a paper of M. Marmy, of Lyons (p. 276), of which a résumé only is given. It will be sufficient to say here that M. Marmy, while admitting the physiological importance of the periosteum to the growth of bone, denies that any advantage has as yet accrued to surgery from subperiosteal resections, and gives a decided preference to the method by "évidement" which M. Sédillot has recommended.

Another paper in the same sense follows (on p. 300) by M. Desgranges, also of Lyons. M. Desgranges denies altogether the advantage of preserving a strip of periosteum to cover the stump of a bone in amputation, or of stripping off the periosteum from a loose fragment in compound fracture, supporting his opinion by cases in which such proceedings have failed. He denies that in the formation of a new nose, or the closure of the hard palate by the so-called "osteo-plastic" method, any evidence has been given that bone is really reproduced. M. Desgranges then criticises the cases of M. Ollier, in which the superior maxillary bone was taken away subperiosteally, and reproduction was said to have occurred, and the operations of M. Larghi, Borelli, and Crensy-Manzo, on the bones of the limbs. He concludes that there is no proof that the maxilla was reproduced; and with respect to the operations on the limbs, he concludes that the patients were affected with necrosis, that the new bone was taken away with that which was dead, and that the operation was fatal twice out of six times. M. Ollier replies to these attacks on his favorite doctrine (p. 326) in a paper which undertakes to deal with all parts of the question, both physiological and surgical. He says that he has practised subperiosteal resection 30 times. The results are only indicated in general terms; but M. Ollier says that in the unsuccessful cases erysipelas has been the chief cause of failure, and that in better circumstances of hospital atmosphere he could have practised the method more freely. M. Ollier, however, does not enter into the details of his cases, reserving them for a special work which he promises on the subject. It can scarcely be said, however, that M. Ollier replies in all particulars to the criticisms of his opponents.

M. Sédillot, "On the Influence of Mechanical Causes on the Form and Development of the Bones, and on the Moulding of these organs

by solidifiable matter injected under their periosteal sheaths" (*Gazette Hebdomadaire*, Jan. 27, 1865).—"The consolidation of fractures where the fragments are separated from each other is brought about in the same way as when the fragments are in contact, viz., by the production of periosteal cells, which extend from one of the fragments to the other, forming those voluminous and misshapen calli so often seen. The regeneration of articular ends presents a series of identical phenomena of the most curious kind. The osseous material, after having reproduced the shaft more or less completely, penetrates the joint-cavity in consequence of meeting no resistance, and moulds itself in that cavity, so that it may reproduce exactly the form and volume of the excised bone. When the periosteum is not preserved in resections the regeneration is effected, but with less regularity, by the fibromuscular sheath, which limits the parts removed. The same observations apply to morbid ossifications of the periosteum, when the bone beneath it is not removed, and to those which take place in the interior of bones which have been scooped out. In these cases the new layers of bone are moulded on the bones in contact with them; and thus in cases of necrosis the ligaments, tendons, vessels, nerves, and muscular impressions, are graven on the bone which is regenerated. From this it is intelligible why a tight bandage should hinder the formation of callus—a fact which has been contested.

"I have repeated for a long time the same observations on the subject of sequestra. Far from extracting them before they are isolated and movable, as has been proposed in these days, it is essential (unless from some special contra-indication) to leave them, as was anciently prescribed, till the new bone has acquired strength enough to support the limb, and to preserve its form and length, and resist muscular contraction.

"If a bone be removed, leaving the periosteum, and liquid plaster be injected into this membrane, after its edges have been brought in contact with a suture, the form and dimension of the resected bone are very exactly reproduced. The imprint of the tendons, the projection of the apophyses, the tuberosities, even the articular extremities, are represented with remarkable precision, and the degree of resemblance between the excised bone and its plaster cast depends on the integrity and consistence of the periosteal sheath, and the overlapping of the edges where sewn. Thus, in a few minutes results are obtained nearly identical with those of regeneration of bone on animals.

"In the forearm and the leg, the resection of one bone not interfering with the length of the limb, and the periosteum being thick and hard, the casts are better than in the arm or thigh, and the tibia has appeared to me to present the most favorable conditions for moulds of this kind. Is it not interesting to remember that the few successes of subperiosteal resections on man, undertaken from errors of diagnosis, or very rash curative attempts, have been furnished by this bone; and is not there in this double success a sort of proof of the mechanical influences whose importance I wish to show?

"It may be concluded from these facts that the success of osseous regenerations depends on two principal causes:—1. The integrity of

the periosteum. 2. The regularity and immobility of the surfaces, sheaths, or moulds, in which the osseous matter is formed.

"Thus is explained the rapidity or slowness of the generation of bone, by the diverse degrees of alteration or destruction of the periosteum (by wound, inflammation, ulceration, suppuration, gangrene), and the immobility and regularity of the surfaces where the osseous cellules are deposited and agglomerated, serve to explain the superiority of the method by scooping (*évidement*) over that of subperiosteal resection, because in the former the mould is regular, immovable, and invariable, and the periosteum intact, while in the latter this membrane is always more or less altered, sometimes destroyed, and the mould incomplete, mobile, and irregular."

Osteoplasty by displacing the periosteum.—In the '*Gaz. des Hôp.*,' Feb. 18, 1865, will be found the report of a discussion at the Soc. de Chir. de Paris on a communication by M. Sédillot, in which he entirely denies the reality of the reproduction of bones in the human subject by the displacement of strips of periosteum; although he allows that this may take place in animals. In particular, he denies altogether that there is any proof of reproduction of bone after Langenbeck's operations for fissure of the hard palate, and appeals to the experience of other surgeons (Heyfelder, Ehrmann, Billroth, and himself) who have operated in the same way, but have failed to convince themselves of the reality of such osseous reproduction.

"A Case of Transplantation of the Periosteum of the Frontal Bone in Rhinoplasty" is related by Mr. Stokes in the '*Dublin Quart. Journ.*' for May, 1865.—The patient recovered favorably, and the new nose appears from the drawing to be both shapely and prominent. Still no details are given by which we can judge whether any benefit really resulted from the transplantation of the periosteum, since there is no record of any investigation having been made of the transplanted flap in order to ascertain whether bone was or was not deposited in it.

The following refer to affections of joints, and operations upon those parts:

In the '*Brit. Med. Journ.*,' Oct. 20, 1866, a paper is published, which was read by Mr. Nunneley at the recent meeting of the British Medical Association at Chester, "On the Reduction of Dislocations (more especially of the Hip and Shoulder), by Manipulation."

After some preliminary observations, Mr. Nunneley proceeds to give notes of 25 cases, in most of which this treatment was successful. The remainder of the paper we give in his own words:

"Of these 25 cases, 21 were dislocations of the hip and 4 of the shoulder.

"Of the 21 dislocations of the hip, 14 were upon the dorsum of the ilium, 5 into the ischiatic notch, and 2 into the thyroid foramen, or near to it. One was converted into a dislocation on the os pubis.

"Of the four dislocations of the shoulder, 3 were under the pectoral muscle and 1 into the axilla.

"The ages were as varied as possible. One man was of the unusual age of 72 years, and 1 a child of the, perhaps, still more unusual age of

only 30 months. In both cases the symptoms were remarkably well marked, and in both reduction was most easily accomplished by manipulation. With two exceptions only—the young child, and the farm servant girl, who was employed at man's work, and who was as muscular and strong as most men of her age—all were male subjects, and most of them young athletic labourers, in whom reduction might be expected to be as difficult as it is ever likely to be.

“Out of the 21 cases, manipulation was tried in all but 1; it succeeded in 14, and failed in 7. In these 7, who were afterwards subjected to the pulleys, 3 were reduced on the first attempt; 1 failed in the first attempt, but succeeded with considerable difficulty in a second effort; three failed altogether; and in another, though it was thought the bone was reduced, subsequently it was again found to be misplaced, and could not be permanently reduced—making 4 cases in which, doubtless, fracture of the acetabulum or of the neck of the bone accompanied dislocation, and prevented reduction. Of these 4 cases, 3 recovered in a few months, with very little deformity. There was some shortening, for which a high-heeled shoe had to be worn; and some loss of motion remained; but still the mischief was far less than was anticipated. In the fourth case (No. 3) the woman had, for twelve or fifteen months, to wear a stiff leather support to keep the bone *in situ*; but she also, it is said, was then enabled to walk well without it. She is now lost sight of.

“In estimating the value of manipulation, as compared with extension, in effecting reduction of the various forms of dislocation of the hip and shoulder-joint, it is obvious that all these 4 cases must be excluded from the calculation. In the 14 cases in which manipulation succeeded it did so with difficulty in only 1 case; in all the rest the reduction was easily accomplished. In 3 or 4 cases, certainly, less than one minute was occupied, in 2 of them not more than thirty seconds were required, to put the bone in position; and in the remainder, where there was the greatest difficulty, in no one was the time occupied more than ten minutes. So that, compared with the average time taken up in reduction by extension, all may be said to have been easily reduced. Indeed, when reduction is so easily effected, the effect is almost magical—so easy and simple does the proceeding appear to the bystander, more especially if he has witnessed the preparations, the various assistants required, the time often occupied, and the force exerted, in an ordinary reduction of dislocated limb, when effected either by manual or pulley extension. If intelligent, he must regard it as the very perfection of surgery. If not so, it would seem as though the distorted limb had merely to be lifted up, and, by some magical influence, instantly laid again, restored to its normal form, without much effort or skill on the part of the manipulator, who requires no other assistance whatever. It is, however, only to the uninitiated bystander; for certainly important considerations, founded on the anatomy and physiology of the parts, must be carefully studied and thought of before success, as a rule, will reward the attempt. Without this, harm, rather than good, is likely to result; and, if the displaced bone be moved at all, it most likely will only be to substitute one form of dislocation for another, as from the ischiatic notch into the thyroid

foramen, from the dorsum ilii on to the pubis. In estimating the comparative value of reduction by manipulation, it is only fair to mention, successful as the practice has been in the hands of my colleagues and myself, it is highly probable that, after the method becomes more familiar to us and others, and the required conditions better understood, that greater and more favorable will be the general results; for to each of us the practice was new, and had to be done for the first time by each of us. I need hardly remind my hearers that it is precisely in such manual feats as these that practice makes perfect; and that those who have before done it, or seen others do it, are likely to perform better than those who have not had the advantage.

"The most important condition to be ensured is a relaxed, but not perfectly helpless, flaccid, uncontractile condition of the muscles; as it is by the contraction of the muscles which are attached near to the head of the dislocated bone that reduction is mainly accomplished. The importance of constantly bearing this in mind I cannot too strongly impress upon those who may feel inclined to attempt the plan of reduction by manipulation. If the muscles which are more immediately concerned be in a state of active, rigid contraction, as they commonly are after a dislocation has existed for a short space of time, and the patient has recovered from the immediate shock of the accident, they will almost inevitably prevent those movements of the bone which are essential for its being brought into a position for slipping into the socket, whence it has been removed; while, on the other hand, if they be incapable of any contraction whatever, it will frequently be found to be impossible for any manipulatory movements of the surgeon to replace the bone, or, being replaced, for its being retained in its position. I feel confident that I have seen both of these causes materially interfere with success, particularly the latter one, when the muscles have been entirely paralysed, owing to the anæsthesia having been rendered too profound. In the wish to prevent any muscular resistance whatever, the necessity for some contractility has been forgotten, or not understood. If the patient be still suffering from the shock of the injury, sickness, drunkenness, or, from age or any other cause, be in a depressed condition, he will hardly require to be put under chloroform or any other anæsthetic; but, on the contrary, if the patient be young and vigorous, if the muscles are in strong contractile action, or have been shortened by the loss of their normal opposing resistance, particularly where the dislocation is of long standing, or where there are adhesions to overcome, then the anæsthesia should at first be sufficiently profound to allow of free manipulatory movements being effected, so as to have overcome all such resistance by the time returning contractile power in the adjuvant muscles may be ready to pull the bone into the socket.

"As the first commencement of manipulation, particularly in cases of recent dates, the movements made with the limb should be very gentle, not rough nor abrupt. The limb should be well flexed; then, when all the muscles are relaxed as much as possible, and, so to speak, thrown off their guard, the limb should be suddenly and rapidly, but not violently, rotated on its axis, and completely abducted or adducted, as the case requires, and at the same time depressed or raised, when the

adjuvant muscles will be perceived to rapidly contract. Thus the bone is partly pushed by the surgeon and partly pulled by the muscles attached near to its neck into its place. A snap is commonly, but not invariably, heard; and the reduction is accomplished. This, I believe, can only be rapidly and brilliantly accomplished under the muscular conditions which I have indicated.

"I need hardly detain the members by any very minute description of the precise manner of proceeding in each form of dislocation, as this must necessarily be varied to some extent with each form of dislocation, and must be guided by the surgeon's own knowledge of the anatomy of the joint; the object being, I would merely say, to use the limb as a lever to bring its displaced head into as near a position to its socket as is possible, at the same time calling into action those muscles which will immediately act upon it in pulling it through the ruptured capsular ligament at the socket, and at the same time relaxing those which may have a contrary effect.

"As a rule, I think the patient should be laid on his back upon a mattress placed upon the bed, the floor, or a large table, so as to be firmly supported. When the muscles are thought to be sufficiently relaxed, and the patient is quite quiescent, the surgeon, supposing the dislocation to be on the *dorsum ilii*, or into the ischiatic notch, should mount upon the mattress, and, standing above him (if it be a dislocation of the shoulder, standing beside the patient on the affected side will be the proper position), quietly seize, with both hands, the leg of the dislocated limb; gently flex it upon the body; adduct it; then quickly rotate the head of the bone, which brings the muscles into play; and, almost at the same instant, suddenly and forcibly abduct the limb and bring it down into an extended position, when, if the movements be successful, the reduction is effected. If the head of the bone be in the ischiatic notch, while the movements will be of essentially the same character, the flexion will be required to be somewhat less than when it is high upon the *dorsum*; while the abduction, as the limb is rotated, must be more forcible, or the head of the femur will not be lifted out of the notch over the high edge of the acetabulum; and care, as has already been said, must be taken, or, instead of passing into the cavity, it will be thrown into the thyrioid foramen. Should the dislocation, whether primary or secondary, be on this foramen, the movement must be one of full adduction, instead of abduction, so as to bring the head of the bone near to the socket.

"Though this plan of reducing dislocations has been spoken of as one more especially adapted for cases in which the head of the bone is in the ischiatic notch, I believe it will be found that, in this position, reduction by manipulation will be more difficult, and more frequently fail, than in any other form of dislocation to which the hip is liable."

In the 'British Medical Journal,' Nov. 3, 1866, Mr. Birkett gives the following summary of cases of dislocation under his care, reduced by manipulation:

- "1. 1848, February. Dislocation into foramen ovale; a female, æt. 22.
- "2. 1849, December. Dislocation on to *dorsum ilii*; a female, æt. 45 to 50—the twenty-second reduction.

- "3. 1850, February. Dislocation on to dorsum ilii; a female, æt. 29.
 "4. 1850, February. Dislocation into ischiatic notch; a muscular male, æt. 56.
 "5. 1851, April. Dislocation into foramen ovale; a very muscular male, æt. 30.
 "6. 1854, January. Dislocation on to foramen ovale; a very muscular male, æt. 28.
 "7. 1854, March. Dislocation on to foramen ovale; a male, æt. 13.
 "8. 1855, April. Dislocation into ischiatic notch; a female, æt. 36.
 "9. 1855, September. Dislocation into ischiatic notch; a female, æt. 9 to 10.
 "10. 1858, August. Dislocation on to dorsum ilii; a male, æt. 53.
 "11. 1859, April. Dislocation into ischiatic notch; a male, æt. 26.
 "12. 1860, March. Dislocation on to ramus of the pubis, with simple fracture of the same femur at its upper and middle third; a male, æt. 12. The value of this method was most strikingly exemplified in this case, for we literally replaced the head of the femur in the acetabulum with the hands.
 "13. 1861, October. Dislocation on to dorsum ilii; a female, æt. 31.
 "14. 1863, March. Dislocation on to dorsum ilii; a male, æt. 47.
 "15. 1864, March. Dislocation on to dorsum ilii; a male, æt. 66, knocked down in the streets, and complicated with simple fracture of the left clavicle and several of the ribs on the left side. The patient, however, completely recovered.
 "16. 1864, September. Dislocation into ischiatic notch; a very muscular man, æt. 52.
 "All these patients were under the influence of chloroform at the time of the reduction of the dislocation.
 "Thus, 6 dislocations of the femur on the dorsum ilii, 5 into the ischiatic notch, 4 into the foramen ovale, and 1 on the ramus of the pubes, were reduced by manipulation without the aid of pulleys during the last 18 years."

In 'Schmidt's Jahrb.,' 1866, vol. 139, p. 311, vol. 130, p. 54, Prof. Streubel gives a very full description of the mechanism of dislocations of the patella. The communication is prefaced by an historical account of the matter on this head which is to be found in the writings of former authors, and of 2 cases which occurred in the author's own practice. He then proceeds to give directions for the production of this dislocation in the dead subject. These directions are, perhaps, too long for us to give here, since, doubtless, any one who wished to undertake this study would prefer to consult the original or an exact translation from it. Suffice it to say that Prof. Streubel describes two ways of producing this dislocation on the dead body, one by means of an ingenious machine for applying screw-pressure directly to the patella, and thus forcing it out of the joint, and the other by movements applied to the leg. This latter requires great force. He only succeeded by either direct or indirect violence in producing the displacement on to the outer condyle. These experiments prove that dislocation, even incomplete, of the patella cannot take place without laceration of the

capsule of the joint. In complete dislocation outwards this laceration is often very considerable, and extends to the inner edge of the expansion of the common extensor tendon. It is held in this position by the extensor tendon and the ligamentum patellæ, and, if reduction is found impossible after the extensor tendon has been relaxed to the utmost, the cause is to be found in the tension of the ligaments. Sometimes the dislocated patella can be pushed backwards and forwards on the outer surface of the condyle, yet it cannot be reduced; the reason is that the tension of the ligaments is too great to allow of the ridge on its inner surface being raised above the process on the outer condyle. In the living body these difficulties are increased by swelling and tension of parts. The dislocation inwards could not be produced on the dead subject, since in its normal state the ligamentum patellæ is too short to allow of dislocation on to the broad surface of the inner condyle. From his researches on the dead body the author concludes that this dislocation can only occur in joints whose ligaments have been previously relaxed. The author proceeds to consider the appropriate methods of reduction, and the condition of the joint in unreduced dislocations, which does not seem to be always so bad as would be imagined. He dissuades all operative interference, as by subcutaneous section of ligaments.

The dislocations of the tarso-metatarsal articulations form the subject of a communication by Dr. Hitzig to the 'Berlin. Klin. Wochenschrift,' ii, 39—42, 1865, which is abstracted in 'Schmidt's Jahrbücher,' 1866, p. 194.

He first relates a case under his own care, where a man in escaping from prison jumped a height of two stories, alighting on the ball of the left foot. He felt a crack, with violent pain; could not walk, but crawled some distance to a carriage. He was seen 7 days afterwards; there was moderate œdema and bruising, extending up the leg. There was a projection in the situation of "Lisfranc's joint," which could be plainly felt to be due to the projection of the 1st metatarsal bone partly, and of the 2nd, 3rd, and 4th completely, on the dorsum of the foot, the 5th being in position. The anterior part of the foot made a slight angle outwards with the posterior. The dislocation was reduced next day under chloroform, two assistants making extension and counter-extension, while the surgeon pressed the dislocated bones into their places with his thumbs, supporting the sole with both hands. The 2nd, 3rd, and 4th metatarsals were thus reduced with a distinct crack, but the semiluxated 1st metatarsal gave more trouble, and, in fact, could not be entirely reduced. After the application of a plaster of Paris splint, however, for 6 weeks, the position of this latter bone seemed perfectly natural, while the head of the 2nd metatarsal was somewhat raised. The foot was perfectly restored. The author refers to 21 cases of such dislocations mentioned by Malgaigne, and adds 8 of his own, making 29, to which the writer in 'Schmidt's Jahrb.' adds a 30th from Hamilton. These are thus divided:—Dislocations of single metatarsal bones, 13, viz., 2 of the 1st; 1 of the 2nd, reduced; 1 of the 4th, reduced; 2 of the 4th and 5th, one reduced, the other died of tetanus; 3 of the three first, 1 reduced, 1 irreducible, in the 3rd reduction was not attempted,

but the foot was tolerably useful. Two of the 2nd, 3rd, and 4th; in one the dislocation had never been reduced, but the foot was useful, in the other abscess formed after unsuccessful attempts at reduction, and the patient died; 2 of the first 4, one above related, in the other only one of the bones (the 4th) could be reduced, yet the foot was useful. In 11 cases the entire metatarsus was dislocated upwards; in 1 downwards, in 3 outwards, in 1 inwards. Out of these 29 cases, one died from the direct effects of the injury, and two apparently from the effects of the attempts at reduction; a fourth died of other injuries. If the dislocation can be reduced at once, the prognosis is good; and even when the dislocation is irreducible, if the displacement is in the vertical direction, little loss of function need be apprehended; but when the displacement is sideways the foot is not so useful. The writer dissuades too energetic attempts at reduction, as not free from danger. If, along with forcible extension, lateral pressure be also used, the metatarsal bones may be pushed under one another. He rejects the use of pulleys for producing extension, and especially Malgaigne's hooks. Tourniquets may sometimes be used, but manual extension, and counter-extension with pressure of the thumbs on the displaced bones, chloroform being administered, is in his opinion the method most likely to succeed.

A paper by M. Pravaz, "On the Curability of Congenital Dislocation of the Hip," is translated in the '*Journal für Kinderkrankheiten*,' xlv, p. 1.—M. Pravaz relates the case of a child $7\frac{1}{2}$ years of age, with congenital dislocation of both hips, in whom he attempted the reduction of the bones in the following manner. He began by manual extension, continued over $6\frac{1}{2}$ months, which met with considerable resistance, in consequence of the muscular development of the child. Then he successfully attempted to bring the head of one femur (the right) into its place, which was easily done by gradual traction; a contentive apparatus was then applied, and after the lapse of a few days the head of the femur appeared tolerably fixed in its position. It was, however, at first very liable to redisplacement, and could then be easily reduced, with a snap like an ordinary dislocation. After two months of this treatment the head of the femur appeared to be quite secure in position, and reduction was effected in the same manner on the other side. Two months afterwards the child was seized with a fever, from which she soon recovered, but this compelled the disuse of the apparatus, and the dislocation recurred first on the side latest reduced, then on the other. Reduction was, however, easy, and after two months' interval the apparatus was reapplied and the treatment recommenced. Finally, one year after the reduction of the first (right) dislocation, she was first allowed to make some attempts at voluntary motion in the upright position, but with an apparatus. Five months afterwards this was exchanged for a portable support, which was discontinued, and the child allowed to go alone, 20 months after the original reduction, or 26 months after the first beginning of the treatment. The condition of the child 3 years after the commencement of treatment is minutely described, as to which we need only say that the only sign of the dislocation which remained was a slight limp and a slight projection of the trochanter, together with

some weakness of the muscles of the back. The position of the head of each femur was natural.

M. Pravaz regards this case as the first in which reduction of a congenital dislocation has been indubitably effected. He argues that, although in later life the parts may appear not to admit of solid coaptation, this is not the case in early life, as dissections seem to prove.

M. Pravaz proceeds to explain his system, which consists of three parts:—1. Preliminary extension; 2, reduction and coaptation of the articular surfaces; 3, restoration of the movements. The preliminary extensions M. Pravaz regards as indispensable, in order to correct the tendency of the muscles to draw the head of the femur up if restored to its proper position. The extension is to be kept up gently for several hours, and it will be found that after this time the muscles have far less power to elevate the head of the femur. The restoration of the movements of the joint by passive motion, and afterwards by voluntary motion in the horizontal position, M. Pravaz regards as necessary in order to deepen the articulation. M. Pravaz defends his late father (whose plan this is which he follows) from the charge of supposing that the acetabulum is to be deepened by the presence of the head of the femur. His idea was, that adhesions formed around the cavity, in consequence of irritation around its edge from these movements, and thus a sort of false joint was formed in the natural situation. That reduction can be easily effected, in ordinary cases, after the muscles have been properly extended, M. Pravaz says he can assert from repeated experience. The sensation of reduction is usually perceptible both to patient and surgeon.

In the 'St. George's Hospital Reports,' i, p. 217, Mr. Brodhurst makes the following observations on the treatment of congenital dislocation of the femur:—"At birth the acetabulum and the head of the femur retain their normal characters; and when it is recognised, the dislocation at this time will be reduced by gently extending and flexing the limb. But after some months changes occur: absorption of the cartilaginous surfaces takes place; and ultimately the head of the bone loses its cartilage, and becomes irregular in form. These changes go on very slowly, however, so that the integrity of the cartilaginous surfaces is retained almost complete, in some instances until the end of the second year.

"The cartilaginous lip of the cotyloid cavity becomes absorbed quickly, and important changes take place in it more rapidly than in the head of the bone. Consequently the head of the femur may be drawn down into the acetabulum; but it is difficult to fix it there. The means of retention are diminished; and the muscles which are inserted into the trochanter, being contracted, tend to displace again immediately the head of the bone. These considerations induced me to propose the subcutaneous section of the muscles which are inserted into the trochanter, and subsequently to draw down the head of the femur and fix it in the acetabulum. This operation is easily accomplished, and its success is complete.

"On the 21st of March, 1865, I performed this operation. I had been consulted by Mr. Herbert Barnes respecting a case of congenital dis-

location of the head of the femur some months previously, when I proposed the operation to which allusion has been made; but it was not at first acceded to. Extension was, therefore, employed for many months, but without any real advantage being gained; and consequently it was determined to resort to operation.

"With the assistance of my friend and colleague Mr. Holmes I divided all the muscles which are inserted into and about the trochanters, especially the glutei and the rotators. The head of the femur was then drawn down to the acetabulum, and it was found that it remained in that position, and that there was no disposition to displacement. The limb was bandaged to a straight thigh-splint, and sufficient extension was employed to keep the head of the femur in contact with the acetabulum. This was easily effected, there being no disposition to retraction. In two months after the operation consolidation had advanced about the head of the bone so thoroughly, that there was no disposition for the head of the bone to escape, but it remained perfectly *in situ* while passive motion was employed. The natural motion of the hip-joint was imitated daily for a month, and the child was then allowed to walk with an instrument, which was so contrived as to prevent the escape of the head of the bone from the acetabulum, but which allowed the movements of the limb to be free. This instrument was worn during the day for six months. After this time it was not worn constantly, and at the end of twelve months it was discontinued. At that time the child walked strongly and without limping; and, indeed, there was scarcely any peculiarity of gait. She required no other assistance than a thickened sole to her boot, to the extent of about one eighth of an inch, to enable her to walk well.

"This case has induced me to propose a similar operation in other cases of a like kind.

"In children under two years of age it will probably not be necessary to have recourse to this operation. Through extension alone the head of the femur may be restored to and retained in the acetabulum; but after this age there is great difficulty in preventing the escape of the bone from the cavity; and consequently, if it cannot be otherwise accomplished, subcutaneous section may be had recourse to. I expected to find that considerable muscular weakness would result from the section of the tendons and muscles about the neck of the femur, but this was not so; and I was much gratified to see the child walk easily and firmly before the instrument which was worn for support was finally discarded.

"If, then, the head of the femur can be drawn down to the acetabulum, but cannot be there retained, it is justifiable to divide the muscular and tendinous structures which have been above indicated, and to fix the head of the femur upon the acetabulum; and this operation may be performed at any age prior to the formation of a new joint on the dorsum ilii."

In the 'British Medical Journal,' Sept. 8, 1866, Dr. Dick thus describes a new method which he has invented for extracting loose

cartilages from the knee-joint:—"The operation can be much more easily performed by making a subcutaneous incision with an instrument which I have invented, and which is something like a pair of scissors, each blade having sharp edges, and which, when closed, has the form of a lance, but, when introduced and opened, can act as a forceps. The operation with these forceps-scissors, as I may call them, is performed on the same principle as the subcutaneous incision with the tenotome. An assistant fixes the foreign body. The surgeon then thrusts in his subcutaneous scissors (closely shut), at a distance of about three inches from the foreign body (generally the neighbourhood of the border of the tibia is the most suitable spot, but the choice of the point of puncture must depend on the position and seat of the foreign body). When the point of the scissors comes into contact with the foreign body they are opened, and the foreign body is then seized with them, and cautiously extracted as follows:—When the surgeon perceives that he has grasped the foreign body, he should with his left forefinger press on that part of the foreign body and instrument which is next to the inner joint-wound, in order to prevent the air from entering; and the finger should follow the substance all along its course until it is extracted through the opening previously made. When the foreign body has arrived near the skin-puncture, it should be released from the scissors, which should now be *shut* and withdrawn; the foreign body should then, by gentle manoeuvres, be pressed out through the external puncture. The reason of this latter part of the procedure is that, if the foreign body were retained in the scissors until they were finally withdrawn, the external opening would thereby be rendered much larger than it should be for a subcutaneous puncture. By the above method it is not necessary to leave the foreign body in the puncture (or rather in the tract of the puncture) near the skin; and, indeed, I think it is much better to extract it at once, and thereby remove a source of local irritation. A small compress and piece of sticking-plaster, and the knee well bandaged and kept quiet with a well-padded splint, in the semiflexed position, propped up on a cushion, is the only after-treatment necessary."

The lectures of Mr. Hancock, as Professor of Anatomy and Surgery at the Royal College of Surgeons, in June, 1866, are published *in extenso* in the 'Lancet,' i & ii, 1866. The following are the chief points on which Mr. Hancock dwells:—Lecture I refers to the anatomy of the foot. Mr. Hancock prefers the arrangement of the tarsal bones, propounded by Bishop, into an external and internal series, the os calcis being common to both rows. In the arrangement of the calcaneo-scaphoid ligament Mr. Hancock describes a prolongation sent up on the inner side of the foot, to complete the socket of the astragalo-scaphoid joint in that direction—an arrangement, according to him, of considerable importance. He also dwells on the use of the sesamoid bones of the great toe in preserving the position of the head of the first metatarsal bone, the attachment of these bones to the tendons of a muscle enabling them to be accommodated to the varying positions in which shocks are received by this joint. Next Mr. Hancock combats the

opinion that the arch of the foot is maintained by the tension and elasticity of its ligaments. He argues, on the contrary, that the contractile power of the muscles (chiefly the tibiales, peronei, and the muscles of the first layer of the sole) is necessary for this purpose. Mr. Hancock also, in opposition to Dr. Humphry and most other anatomists, describes the keystone of the arch of the foot as being formed, not by the astragalus, but the scaphoid bone. Dr. Humphry, however, reasserts and defends his opinion in the first number of the new 'Journal of Anatomy and Physiology.' Lecture II. In discussing the surgery of the foot Mr. Hancock remarks that it is not yet sufficiently conservative. "So long as disease was restricted to the phalanges and metatarsal bones, Hay's operation came into requisition. Let it, however, encroach ever so little upon the first row of tarsal bones, and the whole region between the medio-tarsal and tarso-metatarsal articulations was condemned, and Chopart's amputation had recourse to. Any invasion of disease on the astragalus and os calcis, notwithstanding the rest of the foot was healthy, until recently (and, I regret to say, too frequently, even at the present time) called for Syme's amputation." This practice the professor condemns, contending that the surgical proceedings should be regulated by the amount and character of the mischief ("pathological surgery"), rather than by its mere situation ("anatomical surgery"). Mr. Hancock next proceeds to contrast the old state of surgery, as it was when amputation at the upper third of the leg was the only operation resorted to for incurable disease or injury of the foot, with what it has become since the introduction, by Mr. Syme, of amputation at the ankle-joint; by Mr. James, of Exeter, of Chopart's amputation; by Mr. Wakley, of excision of the ankle; and by Mr. Teale, of Leeds, of excision of the tarsal bones. He notices especially Mr. Teale's case, in which he removed the calcaneum, astragalus, scaphoid, and cuboid bones from a woman aged 22, who in six months returned to her duties as a domestic servant. In reference to these excisions at the posterior part of the foot, Mr. Teale says—"The general result has been very satisfactory. Indeed, I have adopted them as freely for disease limited to the posterior part of the foot as I have done Chopart's for disease limited to the anterior part. There is, however, one condition necessary to success, viz., that we select such cases as are the result of pure healthy (if I may so say) inflammation of ligaments, and not those which have originated in the cancellous structure of the bones."

Mr. Hancock next goes on to advocate the view which would regard the foot as a whole, and, in any amputation which might be necessary, keep as close as possible to the seat of disease or injury, instead of going further back in order to amputate at a row of joints. Thus, by amputating through the scaphoid and cuboid bones, instead of going back to the joint in order to perform Chopart's amputation, the medio-tarsal joint is preserved, to the great advantage, Mr. Hancock thinks, of the mechanism of the stump which is left. The danger of pyæmia, from cutting through the bony tissue, he believes to be exaggerated.

Mr. Hancock gives several cases to show that cutting through the tarsal bones does no harm, and that the fear of harm from opening the

great synovial membrane of the foot is imaginary. He recommends, therefore, that we should avoid destruction of joints whenever we can do so, and for that purpose operate as near the disease as possible, through the tarsal bones. Mr. Hancock recommends, however, that in excisions the diseased parts should be removed by clean cuts of the saw, not bruised off with a gouge or chisel. He then proceeds to remark on the circumstances under which new bone is deposited, and instances the new production of bone which occurs when tendons are displaced or ruptured, of which he gives several interesting examples, especially in the rupture of the tendons of the adductor longus muscle, which takes place sometimes in accidents on horseback, and where he has found by examination on the living subject apparently a bony process reproduced to attach the tendon to the pubes again. Mr. Hancock then goes on to observe on the evil effects of confinement in wounds of joints, remarking that tetanus seldom follows on injuries in which the joint is very freely laid open; and he conjectures, that in many cases, even when suppuration has not set in, but when the suffering from pressure and gradual destruction of joint-tissue so undermine the patient's constitution that it may become necessary to sacrifice the joint, such an issue might, perhaps, be avoided by free incision, dividing the ligaments and tendons around the affected joint. Lecture III is devoted to Syme's amputation, of which the professor has collected 219 instances from English and foreign sources, exclusive of those performed by Syme himself. The gross mortality was 17, or rather more than $7\frac{1}{2}$ per cent., as against 37 per cent. in the leg; 181 operations were performed for disease, with 11 deaths, and 32 for accidents, with 6 deaths. Mr. Hancock argues that if the precautions laid down by Mr. Syme are observed, the various objections to which this operation has been exposed are not tenable. In Lecture IV Pirogoff's operation is discussed, the various modifications in its performance adopted by different surgeons are described, and 58 cases are referred to in which the operation has been performed in this country. Suppuration in the course of the sheaths of the tendons, and in the neighbourhood of the stump, is especially noticed in 11, while sloughing of the flap occurred only in 1 case, and in that is attributed to disease of the blood-vessels. The objections made to this operation by Mr. Syme are discussed, but Mr. Hancock does not allow the validity of any of them. Abscess along the sheaths of the tendons appears to be, in Mr. Hancock's opinion, the most troublesome event which commonly follows the operation. He gives a comparative statement of the results of the two operations in all the cases which he has collected, from which he concludes that the mortality has been less after Syme's amputation; but sloughing of the flap has been more common, and that, on the whole, "Syme's operation appears to me to be unquestionably the best for disease, and Pirogoff's for the accidents of civil life, since by it we preserve an increased length of limb." In Lecture V Mr. Hancock describes the operation of subastragaloid amputation, which he says is hardly known in England, having, as far as he can find out, been performed only by Mr. Simon, Dr. John Traill, Mr. Garner, of Stoke-upon-Trent, and himself. The operation, he says, is in reality a

very good one, and one which, in proper cases, may be adopted with great advantage, in preference either to Syme's or Pirogoff's, inasmuch as the ankle-joint is preserved and a longer limb left. Mr. Hancock is in favour of removing the head of the astragalus at the time of the operation, since it is liable to be displaced by the action of the tendo Achillis and point downwards into the stump. He relates several cases in which the operation was done, and others in which he believes it was indicated. Another operation, devised by Mr. Hancock himself, and which is a modification of the subastragaloid and Pirogoff's amputations, was performed by him some time ago with success, and the patient was exhibited at the College of Surgeons. It consists in removing the head and under surface of the astragalus after the flaps are made, and then sawing off the os calcis, except its posterior third, which is then brought up and adapted to the lower sawn surface of the astragalus. The operation was as follows:—An incision was made from the point of the external malleolus forwards to a little beyond the base of the fifth metatarsal bone, another from about the centre of and below the internal malleolus to a point on the inner border of the foot, corresponding to the end of the external incision; these were united by a cut convex forwards across the sole down to the bones. The flap was then reflected backwards as far as the projections in front of the tuberosity of the os calcis. A fourth incision was then carried across the dorsum of the foot, immediately behind the head of the astragalus. The os calcis was now sawn through as far back as possible, obliquely upwards and backwards; the medio-tarsal joint was then opened, and the anterior part of the foot detached; and, finally, the three articular surfaces of the astragalus for the scaphoid and calcaneum were removed, the end of the os calcis brought up to the under surface of the astragalus, and the flap united by suture. The case did well. Mr. Hancock calls this amputation by his own name. The rest of this and the whole of the sixth and last lectures are taken up with the excision of the astragalus. On this head we will merely give Mr. Hancock's summary, referring the reader to the original paper for his account of various illustrative cases and discussion on the indications for the operation.

“Results of the operation of complete excision of the astragalus performed by British surgeons.—I have collected 57 cases. Of these, 33 were for compound dislocation; of which 5 were complicated with fracture, 12 were for simple dislocation, and 3 were for caries.

“Of the 33 performed for compound dislocation, 24 recovered with good useful limbs; 1 underwent secondary amputation of the leg, and recovered; 8 died, of whom 1 had undergone secondary amputation.

“Of the 12 performed for simple dislocation, 9 recovered with good and useful limbs; of these 12, in 4, of whom 1 died, the bone was allowed to remain for a month; in 1 it was allowed to remain nineteen weeks; in 4, of whom 2 died, the bone was removed immediately.

“Of the 3 performed for disease, 2 recovered with good and useful limbs; 1 recovered for a time, but the disease returned in two years, necessitating amputation of the leg, the patient, however, doing well.

"In 3 the cause is not given. Of these, 1 died and 2 terminated well.

"If to these we add 52 cases performed by surgeons abroad, we get 109 in the whole.

"Of these, 64 were for compound dislocations, of which 5 were complicated with fracture; 4 were for compound fracture; 20 for simple dislocation; 10 for disease (caries); 1 was for necrosis; of 10 the causes are not stated.

"Of the 64 excisions performed for compound dislocation, 50 recovered with good and useful limbs; 1 underwent secondary amputation of the leg, and recovered; 11 died, of whom 1 had undergone secondary amputation; of 2 the results are not given.

"Of the 4 operated upon for compound fracture, 3 recovered with good and useful limbs; 1 died.

"Of the 20 operated upon for simple dislocation, in 4, of whom 1 died, the bone was allowed to remain for a month; in 1 the bone remained for nineteen weeks; in 7, of whom 2 died, the bone was removed immediately; in 2 the bone was removed for secondary caries, but at what period it is not stated. In the remaining 6 the period of removal is not given.

"Of these 20, 14 recovered with good and useful limbs; 3 died; in 3 the results are doubtful.

"Of the 10 cases performed for disease (caries), 6 recovered with good and useful limbs; 1 submitted to secondary amputation two years afterwards, and recovered; 1 died; in 2 the results are doubtful.

"The patient operated upon for necrosis did well.

"Of the 10 cases the causes of which are unknown, 2 recovered with good and useful limbs; 1 died; in 7 the results are not known.

"So that of the 109 cases, 76 recovered with good and useful limbs; 2 submitted to secondary amputation, 1 recovered; 16 died, including 1 in which secondary amputation had been performed; in 14 the results are not known."

In 'Omodei's *Annali Universali di Medicina*,' 1865, vol. 191, p. 383, will be found a digest of a memoir by Prof. Porta on "Dislocations of the Vertebrae," which was read before the Royal Lombard Institution of Science and Letters, and published in series 3, vol. x, of the memoirs of that body. The cases on which this memoir is founded are 27 in number—13 in the cervical, 10 in the dorsal, and 4 in the lumbar region—all traumatic. Two were caused by somersaults, 2 by falls, 1 by the combined action of a bullet-wound and a fall, 2 by indirect force (a blow on the head in one case, and a fall on the nates or perhaps the back in the other); all the rest, 20 in number, by direct blows on the part. Fourteen cases were complicated with fracture, 5 in the cervical, 6 in the dorsal, 3 in the lumbar region. Most were accompanied by palsy. Six only were cured. Dissection was practised in 20 out of the 21 fatal cases.

This memoir does not include any case of luxation of the atlas on the occiput or of the axis on the atlas. Two kinds of dislocation are dis-

tinguished—simple dislocation of the oblique processes, and partial or total dislocation of the bodies. As to the former, in the cervical region it has never been observed in the author's experience or in actual practice, but he gives experiments on the dead body to show its possibility and its kinds. With reference to dislocation of the bodies of the vertebræ, which all authors (including Morgagni) believe to be very rare, the author, on the contrary, asserts that they are common enough, and met with every year in hospital practice. They are occasioned chiefly, according to him, by blows which catch the spine at a moment when its muscles are relaxed. Experiment on the spine removed from the body, and denuded of its muscles, shows that by vigorous torsion the intervertebral cartilage and ligaments can always be torn, and this dislocation be thus produced. The most common direction he finds to be anterior, of which he verified 17 cases out of 26. This is thus explained—that the force acts directly from behind, and, after having ruptured the column, drives its superior part (which Porta considers to be the part dislocated) forwards, in which direction it is also driven by its own weight and by muscular action, while the lower remains unmoved. He combats the opinion of Boyer, that the dislocation is always accompanied by fracture, and refers to 7 cases in which there was no such complication. Even when fracture does accompany the dislocation, the complexion of the accident is determined by the dislocation and the extent of its displacement, the fracture being often indistinguishable till after death.

As to the causes, Porta admits only external force, in opposition to Malgaigne, who believes that muscular action is the chief cause. He relies on the following considerations:—(1) On the uncertainty of the cases brought forward by Malgaigne. (2) On the weakness and indirectness of insertion of the cervical muscles, and on the power of resistance of the dorsal and lumbar columns, so that in none of the regions does it seem probable that the muscles could break the column. (3) On the fact that in tetanic opisthotonos no example of dislocation has ever been observed.

The anatomical lesions in these dislocations may be ranged under four heads—the new relations of the parts of the vertebral column to each other; fracture of the vertebræ; the condition of the natural ligaments of the column, and the state of the organs contained in the vertebral canal.

The change in relation may be in rare cases a simple separation, without any change of axis; from this it may be traced through all grades—semiluxation, complete luxation, up to a perfect riding of one vertebra over the other. The displacement of the bodies involves a corresponding deviation of the processes. As to the concomitant fracture, he regards it as a secondary phenomenon to the dislocation. With respect to the ligaments, in some few cases they may remain intact; but this is rare even in simple separation of the vertebræ, and in real dislocations all the ligaments properly so called are usually torn; but the muscles, which also act as means of attachment to the bones, though more exposed to violence, yet, from their greater flexibility, relaxation, and length, usually escape rupture. It is rare that the dislocation is not

accompanied by lesions inside the canal, ecchymosis between the posterior ligament and the bone, laceration of the dura or even the pia mater, ecchymosis in the medulla, laceration of the latter, and even of the nerves. We must pass over the author's description of the symptoms, and even of the appearances found on dissection, after death from other causes, where union has been completely effected (interesting and novel as the latter is), in order to come to the question of treatment. Here Prof. Porta says the first indication, as in other dislocations, is to reduce it. He rejects the proposal of making an incision on to the displaced parts with a view of disengaging them, believing that the only admissible means of reduction is extension and counter-extension by the gradual traction of assistants, while the surgeon endeavours to effect manual replacement. He believes, however, that reduction is useless in semiluxation, where there is no interference with the functions of the spine, and prejudicial in the extreme forms of luxation, where it might hasten the fatal event. After reduction the parts should be supported by a bandage. Later on, the various symptoms referable to inflammation, to retention of urine, to paralysis, and to emaciation, must be combated by appropriate means.

"Unilateral Dislocation between the Fifth and Sixth Cervical Vertebrae; reduction thirty-six hours after the accident." By Dr. Parsiot ('Gaz. Hebdomadaire,' Nov. 24, 1865).—A woman, æt. 59, had fallen off a load of hay. Thirty-six hours afterwards the author was sent for to her, and found her in the following condition:—The face was inclined to the right, and the chin rested a little external to the sterno-clavicular joint. The cervical region was concave on the right, the heads of the sterno-mastoid muscle being relaxed; on the left it was convex, and the lateral muscles were tense. The spinous processes could be felt without any projection. The head and neck were immovable, and any attempt at motion gave great pain. The patient could not raise the head at all. The face was congested, and the jugular veins turgid; there was slight exophthalmia, and respiration was becoming difficult. The right arm was palsied as to movement, and sensibility was obtuse; there were pins and needles, and cold sensations at the ends of the fingers. The left arm moved freely, but pins and needles were felt also there. All the symptoms were aggravated by any attempt to raise the head. The position of the head had been the same since the accident, but the subjective symptoms had come on gradually, and were increasing. There was no loss of innervation in the lower part of the body. The diagnosis was a unilateral dislocation of the fifth from the sixth vertebra, on the right side.

The patient was placed sitting on the floor; the shoulders and legs fixed; the operator seized the lower jaw with both hands, the thumbs abutting on the mastoid processes, and raised the head gradually, then turned it briskly inwards. A crack was heard, and the patient experienced great relief immediately, and tried to turn her head round. But the paralysis had not disappeared. The patient was placed in bed, with her head extended by means of a weight of two kilogrammes suspended from a band round the jaw, and leeches and cold lotions were applied. Next day the paralysis of the arm had dis-

appeared, and in seventeen days the pricking sensations were gone, and the patient recovered.

Reference is made to a similar case, communicated by M. Michon to the Société de Chirurgie.

A case in which the operation of trephining the spine was performed. By S. Gordon, M.B., Physician to the Richmond, Whitworth, and Hardwicke Hospitals ('Med.-Chir. Trans.,' xlix, p. 21).—The patient, æt. 31, was thrown from a horse, and was immediately affected with paralysis of the lower limbs, rectum, and bladder. The last dorsal or first lumbar vertebra was found displaced. A cast of the deformity was exhibited to the society. The operation of trephining was performed sixty-eight days after the accident. The arch and spinous processes of the displaced vertebra were removed, and the theca vertebralis was exposed. "There was no tension of it, neither was there any evidence of blood having been effused within it; it was therefore not opened." The operation lasted fifty minutes, but was not accompanied by much hæmorrhage. Soon after the operation signs of improvement were noticed. On the fourth day the urine, which had been alkaline, became acid, but this condition did not continue. Sensation improved, and some days later there was observed an increase of motor power. After some time the urine, which was sometimes alkaline, sometimes neutral, became permanently acid, power over the bladder became restored, and the patient was conscious of the passage of feces. Within eight weeks he was able to go out reclining in a basket-carriage. At the time of the report, fifteen months after the accident, he had obtained control over the bladder, could sit erect with ease and comfort, but could not stand, nor had the sphincter ani regained its power. His general health was good.

Dr. McDonnell, who presented the paper to the society, advocates the early performance of this operation, and the removal of the arches of more than one vertebra, whereby, as he believes, the danger and difficulty of the operation are but little increased, and the patient has a better chance of being able to stand and walk.

In the 'London Hospital Reports,' iii, will be found, on p. 325, a large collection of "Clinical and Pathological Facts in reference to Injuries of the Spinal Column and its Contents," followed, on p. 357, by a clinical lecture from Mr. Hutchinson "On Dislocations and Fractures of the Spine." One object of the lecture is to dissuade from operative interference, by showing that many cases recover, if put under favorable circumstances and left alone, and that of those which end in death, very rarely, indeed, can it be asserted after post-mortem examination that an operation could by the barest possibility have done good. Mr. Hutchinson proceeds to show—1. That permanent compression of the cord, or any part of it, by displaced bones, is very rare. 2. That the more serious injuries of the cord are due to indirect violence (bends), and that the displacement of the laminae is of little consequence, and never causes compression. 3. That the cord is hardly ever seriously compressed by extravasated blood. 4. That the displacements of single bones which do occur are usually very easily reduced (probably by the bystanders before the surgeon sees the case), and that

where this is not the case they cannot be reduced by operation. 5. That those cases in which there is the most of perceptible displacement during life are not by any means the most serious. Mr. Hutchinson proceeds to support these views by a careful review of the symptoms connected with these injuries, and lays especial stress on the lesions of the sympathetic (“vaso-motor”) nerve, and the symptoms thus occasioned.

“Disease of the Brain and Spinal Cord consequent on a Railway Collision.”—In the ‘*Path. Soc. Trans.*,’ xvii, 20, Mr. Lockhart Clarke describes the pathological appearances in the nervous centres in the first case where this condition has hitherto been ascertained after old railway injury. The gentleman who was the subject of the injury ($3\frac{1}{2}$ years before his death) had been an intelligent active man; after the accident he began to suffer vague and not very acute pains down the back and in the head, and gradually failed both in mind and body. Before his death he could hardly walk, and had lost control over the bladder. The only morbid change in the white columns of the cord (which was diminished in its whole antero-posterior diameter) was in the posterior. These were darker, denser, and more opaque than the antero-lateral. Microscopic examination showed compound granular corpuscles, isolated granules, and an exuberance of wavy fibrous tissue, replacing the nerve-fibres, which in some parts had wholly disappeared. There were also a great number of corpora amylacea. The extremities of the posterior horns contained an abundance of isolated granules, and the transverse commissure was degenerated in parts. The morbid appearances bore a resemblance to what is found in ataxy, and on inquiry Mr. Clarke ascertained that the patient’s gait was somewhat like that which is found in that affection, but without the jerking or twitching observed in such patients.

Lister, “On Excision of the Wrist for Caries” (‘*Lancet*,’ 1865, i, pp. 308, 335, 362).—Mr. Lister commences this valuable communication by observing, that the first idea of resuscitating the operation of excision of the wrist was given him by a case in which from an injury the ends of the radius and ulna were forcibly thrust through the skin in front of of the hand, so that all the flexor and extensor tendons were more or less injured or displaced; yet the patient recovered the motion of the hand perfectly (after the protruding ends of the bones had been sawn off), under careful and early passive motion. This case proved that the tendons might be freely dealt with in an operation, provided the after-treatment of the case was properly conducted. The great cause of disappointment in previous excisions of the wrist seemed to Mr. Lister to have been the recurrence of the disease, and this he thought would be obviated by the removal of all the bony structures composing the compound articulation, viz. the ends of the radius and ulna, the carpal bones, and the bases of the five metacarpal bones. It is in the cartilage [or possibly Mr. Lister may mean in the portion of bone covered by the cartilage, and therefore forming part of the articulation] that the disease generally recurs. By taking all this away, the best security against recurrence will be obtained.

We pass over the original method adopted by Mr. Lister and his accounts of the improvements which he has introduced into it, in order to produce his latest proposition for the operation, which is as follows. Chloroform is to be given, and a tourniquet applied, in order to keep the parts free of blood. All the articulations of the hand are to be freely moved, in order to break down any adhesions. A radial incision is made, planned so as to avoid the radial artery, and also the tendons of the extensor secundi internodii pollicis, and indicator, commencing above at the middle of the dorsal aspect of the radius, on a level with its styloid process, directed thence, parallel with the course of the extensor secundi internodii pollicis, towards the inner side of the metacarpo-phalangeal articulation of the thumb, and on reaching the radial border of the second metacarpal bone carried downwards longitudinally for half the length of that bone. The soft parts are then raised from the bones, with the knife guided by the thumb-nail. The radial extensors of the wrist are thus severed close to their insertion, and the extensor secundi internodii raised, but not divided, and thrust outwards, with the artery. The next step is to separate the trapezium bone from the rest of the carpus, by means of cutting forceps applied in the direction of the longitudinal portion of the incision, but the bone is not removed at this stage of the proceeding. The hand is now to be bent back, and the extensor tendons separated on the ulnar side of the incision. Next, a very free incision is to be made along the anterior aspect of the ulna, commencing at least 2 inches above its extremity, running between the bone and the tendon of the flexor carpi ulnaris, and carried forwards as far as the middle of the 5th metacarpal bone. The dorsal lip of this incision is now to be raised, and the tendon of the extensor carpi ulnaris severed at its insertion and dissected up, care being taken not to separate it from the integuments. The extensors of the fingers are thus readily separated from the carpus, and the dorsal and internal lateral ligaments of the wrist-joint are divided; but the connections of the tendons with the radius are purposely left undisturbed. Attention is now directed to the palmar lip of the incision, where the ulna is cleared by cutting towards the bone, so as to avoid the artery and nerve. In this process the pisiform articulation is opened, if that has not been done before, and the flexor tendons separated from the carpus, the hand being depressed to relax them. When the unciform process is reached the base of it is to be cut through with pliers. The separation is not to be carried farther than the bases of the metacarpal bones, so as to avoid injury to the soft parts and to the deep palmar arch. The anterior ligaments of the carpus having been divided, the carpal bones can be removed by drawing them out with sequestrum forceps, and touching any ligamentous connections which may remain with the knife. Now the ends of the bones of the forearm are to be thrust out through the ulnar incision, and are to be carefully examined and dealt with according to their condition. It is better to remove too much than too little. In cases of the least extensive disease it will be sufficient to remove the rounded cartilaginous end of the ulna on which the radius rotates (preserving its styloid process, which is useful in order to leave the bones of

the same length), saw off the surface of the radius parallel to its carpal articulation, and clip away its semilunar facet with bone-forceps. This having been done, the ends of the metacarpal bones are thrust out at the radial and ulnar incisions, as may be most convenient, and clipped off with forceps, care being taken to remove also the lateral facets by which they articulate with each other. The operation is completed by dissecting out the trapezium bone, which had hitherto been left behind (with care, so as to avoid the flexor carpi radialis and the artery), and removing the articular surfaces of the thumb and of the pisiform bone and the unciform process, if diseased. The extensors of the carpus are the only two tendons divided, for the flexor carpi radialis is connected with the second metacarpal bone below the point at which it is divided, and so escapes. The radial incision is to be united throughout, the central part of the ulnar incision being kept open for the escape of matter. The operation is a very long and laborious one. It depends mainly for its perfect success on the after-treatment. The principal objects to be kept in view are, to maintain the flexibility of the fingers by frequently moving them, and at the same time to procure firmness of the wrist by keeping it securely fixed during the process of consolidation. Passive motion is to be commenced on the second day, whether the inflammation has subsided or no; and from this time it is to be continued daily till it ceases to be required. In executing these movements each finger is both flexed and extended to the full degree which is possible in health, care being taken that the metacarpal bone concerned is held quite steady, to avoid disturbing the wrist. The splint which Mr. Lister recommends consists of a straight piece of wood, having below it, underneath the part where the ball of the thumb rests, a transverse bar of cork, to give a hold for the bandages and to support the thumb; attached to the upper surface of the splint is a wedge-shaped piece of thick cork, forming a pad to support the palm of the hand, and to the ulnar border of the splint are fixed two supports of gutta percha, to obviate the tendency of the hand to slip inwards. The thumb rests in its natural position, below the level of the fingers, on the transverse bar of cork, and it must be kept extended by a substantial pad of cotton in the angle between it and the forefinger. Passive motion is to be commenced on the wrist as early as possible, and the part of the splint which supports the fingers is to be cut away as soon as the latter become sufficiently consolidated; but the wrist is to be supported for a very long period by some form of splint or laced bandage, in fact, until the patient feels that the hand is as firm without such bandage as with it. Mr. Lister's paper contains detailed notes of ten cases in which more or less perfect success has been obtained by this operation, besides some others not yet completed, and two in which the patients died, though, as it seems, from causes unconnected with the operation.

Eulenberg, "Contributions to the Statistics and the Estimation of the Operation of Excision of the Hip," (*'Langenbeck's Archiv,'* vii, p. 701.)—The author sums up the results of 56 published cases of resection of the hip, on account of carious disease, which have been published

since the appearance of the tables of Fock and of Sayre, and adds a few cases from the Klinik at Berlin. Of these 56 cases, 28 occurred in Germany, 21 in England, 1 in America, 1 in France, and 5 in Russia. As far as the results are known, 24 ended fatally, viz. 7 of the 21 English cases, 15 of the 28 German, 1 of the 5 Russian, and the single French case. Of the remaining 32, 3 are noted as not cured, and with little prospect of a favorable issue, while in 7 other cases the result was imperfect at the date of publication, but the prospects of success were better.* Thus, there remain 22 successful cases; still, the success is only described in express terms as perfect in 12 cases, the utility of the limb being in these plainly specified. In 3 of the fatal cases, however, the death was quite unconnected with the operation, while in one of these (under the care of the present compiler) dissection showed that the success had been complete, and a new joint had been formed.

The causes of death were as follows:—Exhausting suppuration in 13 cases, complicated in 4 cases with progressing caries of the pelvis, and in 3 with tubercles in the lungs; pyæmia in 6 cases; erysipelas in 1; hip disease on the opposite side with phthisis in 1; pneumonia in 1; tubercular meningitis in 1; unspecified causes in 2.

This table combined with that of Sayre gives 164 cases, of which 36·6 per cent. ended in death; 56·1 were cured; 3 per cent. remained unhealed, and in the remaining cases (7 in number) the result was uncertain, but success appeared probable in most. The author draws attention to the fact that the mortality was much less among the English than the German cases. He inclines to attribute this partly to the better air and maintenance of the English hospitals, and partly to the more free resection of the diseased parts which he believes to be practised in this country. Total resections, he says, (*i.e.* resections which include the acetabulum as well as the caput femoris) are less fatal than the mere decapitation of the femur.

With respect to the immediate dangers of the operation, he calls attention to the fact that these have been under-estimated, and that even by writers who have themselves recorded only unsuccessful cases. Of 46 fatal cases in which the date of death is given, in 27 the death occurred during the first month, and in 15 of these within 8 days after the operation; 4 of pyæmia, 1 of erysipelas, and the others chiefly of exhaustion. This shows that the operation is no trifling one. The period of cure is also usually a very long one, and fistulous openings may remain for months or years. In this respect also it seems as if the cases operated on in this country have the superiority (in one under the care of the present compiler the wound was closed in 40 days), and this appears to the author to be mainly the case with total resection. The formation of a false joint, however, and consequent utility of the limb, proceeds more rapidly than the healing of the wound, so that passive motion or even attempts at walking can be commenced while the wound is yet open. The ultimate usefulness of the limb is, he believes, considerable in those patients who survive. Out of 134 operations a useful limb has been obtained in at least 36, besides those

* One of these cases was under the care of the present compiler, and the subsequent result has been favorable.

recoveries which are included among the incomplete cases. With respect to the time for performing the operation, he adheres to Fock's dictum, that it should be done as soon as the surgeon can assure himself of the existence of caries. With respect to the chief sign of the latter condition, crepitus, he calls attention to the fact that it may be absent in cases of central caries, *i. e.* of caries limited to a small part of the middle of the head of the femur. The other symptoms of caries (œdema, cold abscess, fistulæ) are hardly pathognomonic, as they may depend on other conditions of the joint, or on caries of other parts of the bones. Spontaneous luxation (a comparatively rare condition) is both a certain sign of caries and a great facility to the operation, but he dissents from the opinion expressed by some writers that it is no sure sign of the integrity of the pelvis, and also seems inclined to contest (though by no means vehemently) the view of the present compiler, *viz.*, that it is a condition in which resection is less indicated than when the disease progresses without dislocation. Two diagnostic means appear to him to be of great use, and less employed than they should be, *viz.*, exploratory punctures of the joint and thermometric observations. By the former, repeated, if necessary, in various parts of the joint with an exploring trocar, the exact condition of its various parts can be determined with something like certainty, and the existence and seat of caries made out when there is no crepitus. As to the temperature, he asserts that the passage of inflammation into suppuration and caries can almost with certainty be affirmed if there is a considerable rise in the evening temperature, to above 39° C. (102° F.), accompanied by ever so slight a morning rise of temperature, provided, however, that these phenomena are not due to some visceral affection, especially tubercles in the lungs. He gives the tables of temperature of a few cases to prove this. By a combination of these diagnostic signs he says that caries can always be made out, and that it is an indication for performing resection at once, in the absence of contra-indications. He next discusses the latter. Disease of the pelvis he holds to be no contra-indication, nor does he appear to admit any limit of age, though he does not deny that the operation succeeds worse in the more advanced periods of life. With reference to hectic fever, it is a contra-indication when dependent on organic mischief, but on the other hand a strong inducement to operate when it is caused (as it often is) by the disease of the hip. Visceral diseases of course contra-indicate the operation, in so far as they are incompatible with life or with the powers of repair, but he refers to several cases of recovery with chronic kidney and liver disease, probably the so-called "amyloid" degeneration. He speaks doubtfully of the propriety of operating in patients obviously scrofulous, nor does he believe that the operation can be often required in cases of deformity from ankylosis.

This interesting paper concludes by a short reference to the possibility of obtaining more accurate information as to the success of treatment without operation, for comparison with the results of resection, and to the possibility of avoiding operation in many cases by the early and constant use of immovable apparatus, and in a postscript gives the

account of 3 operations performed in the Klinik at Greifswald by Herr Bardeleben, which unfortunately all proved fatal.

Dr. Mursick relates in the 'New York Medical Journal,' Sept. 1865, p. 624, a successful case of excision of the hip for gunshot fracture in military practice. The operation was performed 22 days after the battle. The head, neck, and both trochanters were removed through an incision 6 inches long with no important hæmorrhage. The limb was treated by extension with the weight and pulley, between sandbags. Convalescence was protracted; a ring of necrosed bone separated from the end of the femur, and it was 10 months before the man could leave his bed. A year after the operation the wounds were healed and he began to walk. When seen 14 months after operation he could walk more than 100 yards with a high shoe and a cane, and the usefulness of the limb was rapidly increasing. The shortening was $4\frac{1}{2}$ inches.

The following extracts refer to the surgery of the nerves:

In the third volume of the 'London Hospital Reports,' p. 305, Mr. Hutchinson brings together 7 cases of lesion of the ulnar or the ulnar and median nerves. In the first place he combats the received opinion as to the extent of distribution of the radial nerve, holding, in opposition to the common description in anatomical books, that the nerve does not reach to the tips of the fingers, which are supplied on the back as well as the front from the median nerve. As to the physiological results of injury to nerves, the most marked is the great loss of temperature in the parts supplied by the nerve, often reaching 10° F., and not restored by any artificial heat to the healthy standard. He connects this coldness with a loss of nutrition in the skin, the papillæ of which are wasted and shrunken. Lesions of nutrition are very common, a peculiar kind of whitlow being formed, usually of the skin and subcutaneous parts at the tip of the finger, with exfoliation of the nail. Reparation, however, and reproduction of the nail sometimes takes place. In Mr. Hutchinson's cases the nerves had not been repaired after long periods, but he refers to a case communicated by Mr. Nunn to the Pathological Society, in which a nerve-trunk was repaired after many years. The loss of temperature often extends above the site of the nerve-lesion. There are subjective phenomena, aching in cold, burning in heat, diffused pain over the whole limb, contraction of the paralysed muscles, reflex pain, &c. in the opposite limb.

In 'Schmidt's Jahrbuch,' 125 (1865), p. 212, Martini sums up the operative surgery on nerves of recent times to the following effect. He refers, in the first place, to Gherini ('Ann. Univ. di Med.,' Ap. 1864, 188, p. 94), on the subject of operations for neuralgia. This author divides neuralgiæ into two kinds—anomalous and regular or essential. The former is of local origin, and curable by division of the affected nerve above the seat of the disease; the latter is due to some irritation of an unknown description, and resists all means hitherto put in use. The former description of neuralgia is caused by the formation of a hard painful kernel in the trunk of the nerve, or by cicatrization after a

wound, or by a foreign body, or a severe and deep contusion. Of this form of neuralgia he refers to 8 instances—the first of an affection of the infra-orbital nerve of ten years' standing, caused by cold, and cured by section of the nerve in the infra-orbital canal; four cases of neuroma in the leg, all cured by excision; in two the tumours were developed in the substance of the nerves—true neuroma; in the others in their neighbourhood—false neuroma. The true neuroma can be distinguished from the false in consequence of its being always painful when touched or pressed in any direction, while the false is only painful when pressed in the direction which causes it to impinge on the nerve. The sixth case was that of a man whose leg had been amputated. The anterior tibial nerve appeared to have been implicated in the scar between the two bones, so that the least touch on this spot of the stump caused a sudden contraction over the whole body, as after an electric shock, and there was also neuralgic pain. These symptoms ceased at once on the subcutaneous division of the nerve. The seventh case was that of neuralgia of the whole limb, with tetanic contraction of the muscles of the face, after amputation of a toe. This was cured by reamputation. The eighth case was incomplete.

In contrast to these he gives numerous cases of essential or "regular" neuralgia, in which all kinds of treatment have been found unavailing, viz., 3 cases of facial neuralgia, recurring after the actual cautery, subcutaneous section of the nerve, and even division of all the parts down to the bone; neuralgia proceeding from a diseased toe, and extending to spasmodic contraction of the joints of the limb, recurring after 2 amputations and subcutaneous section of the nerve, and causing death by exhaustion; neuralgia in the knee of a young woman, persisting after amputation of the thigh and excision of a portion of the sciatic nerve, but disappearing after amputation at the hip (Mayor, of Lausanne), together with somewhat similar cases mentioned by Tyrrell, Bransby Cooper, and Marshall Hall; neuralgia of the hand persisting after amputation, subcutaneous injection of atropine and excision of a portion of the radial nerve; and neuralgia of the sole of the foot, exacerbated to a frightful degree by treatment with the actual cautery. In traumatic tetanus Gherardi has amputated three times with no benefit.

He dissuades section of the nerves in this "essential" form of neuralgia, or at least advises that it should be put off till every other means of treatment has been tried, especially electricity. In some observations on this work of Gherardi, by Legouest, at the Société de Chir. de Paris ('Gaz. des Hôp.,' 77, July, 1864), that surgeon observed that a case by Azam ('Journ. de Bord.,' 2 sér., ix, p. 289, Juil. 1864) supports Gherardi's views. The case was one of neuralgia in the stump of a flap amputation of the leg, accompanied with frightful epileptiform seizures. After various other forms of treatment, the peroneal nerve was first resected, and then, as this produced only slight and doubtful benefit, a piece was cut out of the sciatic nerve. This was productive of temporary cure; but the symptoms returned 7 months afterwards, though in a milder degree, after a fall. M. Legouest believes that when this frightful affection follows amputation it is always when the flap method

has been followed, and advises that in such amputations the ends of the nerves should be truncated. At the same debate two cases were brought forward in which Nélaton had operated on nerves—one was for neuroma of the median nerve, in which the tumour was removed, and the nerve, in doing so, was divided, but the ends united with 2 silver sutures. At the date of the report the functions of the nerve seemed to be restored, and the pain had ceased. In the other case a lady had been attacked with zona in the course of the sciatic nerve, accompanied by intolerable pain. No milder measures having proved of any avail, Nélaton took away an inch from the substance of the sciatic nerve, with the effect of producing paralysis of motion and sensation, but no relief to the pain. Richet and Voillemier supported Gherardi's opinion, that in this "essential" form of neuralgia section of the nerve is useless. Some account of the discussion which followed at the society may be found either in 'Schmidt's Jahrb.' or in the 'Gaz. des Hôp.'

We proceed to the subject of suture of nerves. On this subject Langier has written, in the 'Gaz. de Paris,' 1864, p. 409, an article with reference to a case, which we need not quote here at length, since it has been abstracted in the 'Year-Book' for 1864, p. 259. M. Langier concludes, from his own and Nélaton's case, that suture of nerves may be followed by restoration of their function; and in this conclusion he was supported by M. Velpeau, who referred to Flourens' experiments on this head.

In the 'Gaz. Méd. de Paris,' 1865, p. 170, MM. Eulenburg and Laudois publish the results of numerous experiments on the lower animals, made to ascertain whether divided nerves will unite if brought together by suture, as M. Langier believes, and has published a case to prove. The experiments of these gentlemen, 20 in number, were made on dogs and rabbits, partly on the sciatic, partly on the pneumogastric nerve. They all gave a negative result. The nerve never recovered its functions; clear traces of inflammatory degeneration are always found; gangrene followed in one case, death from secondary abscesses in others; consequently they deprecate the practice recommended by M. Langier, although they admit that their negative evidence would not outweigh the positive success of future clinical researches.

M. Boeckel ('Gaz. des Hôp.,' January 7, 1865, p. 10) gives the details of two cases in which he excised a portion of the gustatory and of the mental nerve, on account of neuralgia of the side of the cheek and tongue. He submitted the patients to the action of chloroform, forced the jaws open, drew the tongue by a hook to the opposite side, so as to put the floor of the mouth on the stretch; then he made an incision along the middle of the floor of the mouth on the affected side, only through the mucous membrane, and, after dividing a little alveolar tissue, came down on the gustatory nerve. The nerve having been raised on a blunt hook, was followed backwards beyond the internal pterygoid, and there divided, a portion two thirds of an inch in length being removed. In one of the patients the teeth were gone, and the operation was found very easy; in the other it was a little more difficult from the greater depth of the parts, but offered no serious difficulty. With regard to the mental nerve, M. Boeckel effected its

excision at the same sitting by detaching the soft parts around the mental foramen, and then removing the bone behind this foramen—in the elder patient with a gouge, in the younger with a small trephine—and thus exposing the inferior dental in its canal; a portion (about one third inch in length) was then removed from the canal.

In both cases the neuralgia was cured, at any rate for some months. In the first case (the elder patient, a woman, aged 69) it seems to have recurred, though possibly only slightly, and in some other branches of the trifacial; in the second case the report only extends over 4 months.

“Excision of a part of the Spinal Accessory Nerve for Spasmodic Wry-neck.” By Campbell de Morgan, F.R.S., &c. (*Brit. and For. Med.-Chir. Rev.*, July, 1866).—Mr. de Morgan relates a case of the above operation, the first, as far as is known, in which it has ever been performed; so that both the treatment and the operation itself are quite novel. The patient was a healthy labourer, 32 years of age, who had laboured for a few weeks under attacks of a spasmodic nature, in which the head was drawn to the right side. This was referred to an injury received two months before the accession of the symptoms. The spasms were very violent, and accompanied with much pain. The sterno-mastoid and trapezius were the muscles most violently affected, but they did not seem to be the only ones. In fact, Mr. de Morgan believed that “the spasmodic contractions were due to the antagonistic action of several muscles—the splenius and the inferior oblique and the greater posterior rectus—dragging the face round, in opposition to the action of the trapezius and sterno-cleido-mastoid.” Attempts to restore the head to its natural position, or any handling of the right side of the neck, increased the spasms. The latter were almost constant, both during waking and sleeping. They were conjecturally referred to reflex actions from some deep-seated irritation, perhaps within the spinal canal, “the spinal accessory, the abducens oculi, and some of the branches of the first and second cervical nerves, being principally involved in their production.” After various methods of treatment had been tried in vain (including the section of the sterno-mastoid muscle), Mr. de Morgan determined to attempt to abolish the action of the sterno-mastoid and trapezius muscles by excision of a portion of the nerve which supplies them, hoping that when their action had ceased “that of the antagonistic muscles, even if persistent, might be controlled or tolerated.”

The operation was performed in Feb. 1862 (more than a year after the onset of the disease) in the following way:—“An incision, 2 inches long, was made along the posterior border of the sterno-mastoid muscle, the centre of the incision corresponding to about the centre of its edge. The fascia being slit up to the same extent, the trapezial branch of the nerve was sought for as it emerges from the sterno-mastoid to cross the posterior triangle of the neck. (It would be found generally a little above the centre of the incision.) When found the nerve was traced through the fibres of the muscle—the fibres being cut through, much as is done in an ordinary anatomical dissection—until the common trunk above the division into the trapezial and sterno-mastoid branches was reached, and here a piece about a quarter of an

inch in length was cut out." The relief was immediate and permanent. The patient's condition in Jan., 1865 (about 3 years after the operation) is minutely described. It will be sufficient to say that both the sterno-mastoid and trapezius muscles were paralysed and completely wasted, except a very small portion at the upper part of the former muscle, which was as large and acted as strongly as on the opposite side. The affection for which the operation had been performed was entirely cured. Some curvature of the spine existed, which was attributed to the indirect influence of the paralysis of the trapezius muscle. Mr. de Morgan appends some interesting remarks on the physiology of the spinal accessory nerve, as illustrated by this case.

"The Radial (Musculo-spiral) Nerve compressed in an Accidental Bony Canal, the result of a fracture of the Humerus; disengagement of the nerve by an operation; cure of the palsy." By M. Ollier (*Gaz. Hebdomadaire*, 1865, p. 515).—M. Ollier remarks that when palsy follows on the mechanical compression of a nerve by an irregular callus (a very rare event), it is not under the command of electricity or other means which are available against contusion or transitory distension of a nerve. In the following case M. Ollier successfully adopted an operation for the cure of this condition, which has not been previously attempted.

The patient, a labourer, æt. 22, had suffered a compound fracture of the right humerus at the level of the musculo-spiral groove at the junction of the lower $\frac{2}{3}$ ths with the upper $\frac{3}{4}$ ths of the bone. The lower fragment seems to have pierced the skin. The arm was kept in a starch splint for 40 days. Lacerating pains were experienced at first. These ceased as the fracture united. At the end of the 40 days all the extensor muscles of the hand were found paralysed. Four months afterwards M. Ollier saw him. The bone was slightly swollen at the seat of fracture, and at the back part especially there were marked irregularities. It was firmly united. The forearm was somewhat atrophied. There was complete palsy of all the muscles supplied by the musculo-spiral, and electricity had no effect on them. Sensibility was much diminished in the thumb and forefinger. Pressure on the nerve above the seat of fracture excited sharp pain in a point at the posterior aspect, in the situation of the musculo-spiral groove. Below this no sensation could be elicited by pressure around the callus, but below where the nerve emerges between the supinator longus and brachialis anticus it seemed as if it could be found again, inasmuch as the patient felt a disagreeable sensation, and described some vague pricking sensations, particularly along the back of the forearm to below the wrist. Still, these sensations were not very clearly described, and it could not be positively determined whether they were due to pressure on the musculo-spiral or the cutaneous branch either of the musculo-cutaneous or radial. It seemed probable, however, on the whole, that the musculo-spiral nerve was either compressed by the callus or partially ruptured at the seat of fracture. The integrity of function of the triceps seemed to show that the lesion must be seated below the commencement of the musculo-spiral groove, where the branches for that muscle are given off. M. Ollier came to the con-

clusion, from the history and symptoms, that the nerve was suffering from compression either by one of the fragments or by the exuberant callus. In either case it would be necessary to remove the callus before arriving at the seat of the mischief. But before doing this prolonged treatment by electricity and discutients to reduce the volume of the callus was vainly undertaken. At the end of 2 months the atrophy had increased. An incision was made in the presumed direction of the nerve, so as to expose it in the external intermuscular septum. It was found by tracing a collateral branch (first exposed) upwards, and was then followed to a point where it was seen to emerge from the callus. A fragment of the latter was then removed by cutting forceps. It was found to be smooth, and hollowed out on its lower surface into the form of a groove. A probe distinguished a soft substance at the bottom of the depression left by the removal of the fragment. A large gutter was now cut in the bone by means of the chisel and mallet, and after thus chiseling the humerus to the extent of about an inch and a half, the nerve, which was hypertrophied and thickened, was fully exposed to view. It was seen to be swollen, as if at a ganglion, at the upper part of the gutter which had been cut, and was strangulated at this part by a point of bone directed obliquely, and seeming to be a part of the lower fragment. At this level the nerve was pinched as if by a ligature; it was only 3 millimètres in thickness, while the swollen portion, situated above, was a centimètre in thickness. Below the constriction the nerve was slightly swollen. The osseous point was cut off, and a probe was passed behind the nerve to ensure its complete isolation. It was then followed $\frac{1}{3}$ inch above and below the bony canal, to ensure its complete liberation; and in order to obviate any danger of reproduction of bone, the periosteum was removed all around. The nerve was not disturbed from its gutter, for fear of contusing or stretching it. The wound healed rapidly. From the 6th day the patient experienced some pricking sensations at the posterior and external aspect of the forearm, and sensibility began to increase in the thumb and forefinger. Electricity employed on and after the 15th day produced sensations which he had not experienced before the operation. On the 20th day he could raise his hand a little by voluntary effort, and these movements became daily more considerable. At the end of a month his progress was arrested for a period of 3 weeks, but then recommenced, and the muscles became responsive to electricity; and when he left the hospital ($6\frac{1}{2}$ months after operation) he could extend his metacarpus so as to make an angle of 125° with the forearm, and insisted on going back to his work in the fields.

M. Ollier reasons that the operation was imperatively necessary, there being no chance of natural cure; and says that in case of an error in diagnosis, if the nerve had been found divided instead of compressed, he should have attempted to unite the two ends by a metallic suture, passed through the cellular tissue around them, and he thinks with some chance of success.

The following notes refer to the surgery of the head :

Two cases of gunshot wound of the skull, with perfect recovery, are reported by Dr. Hutchinson, of Brooklyn, in the 'New York Medical Journal,' June, 1866, pp. 217, 219. The first was that of a little girl, æt. 7, who was wounded by a "buckshot" from a toy cannon. The girl walked to see Dr. Hutchinson directly after the accident, and had suffered from no cerebral symptoms, except that she vomited soon after the injury. The wound was half an inch behind the top of the right ear, and a probe passed in 4 inches. There was no opening of exit. Slight vomiting continued for 2 or 3 days; but except this, there was no symptom, and she recovered perfectly. She died of scarlet fever half a year afterwards, having no symptoms indicative of disease of the brain during her last illness. The brain was removed after death, and showed, "by four slightly depressed cicatrices, that the ball entered the posterior lobe of the right hemisphere, near its junction with the middle lobe, and made its exit from the brain upon the opposite side." On re-examination of the specimen a point of unusual hardness was felt, and an incision made here displayed the ball, much corroded, imbedded in the brain substance an inch and a quarter in front, and half an inch below its point of exit from the left hemisphere. It seemed that the ball must have struck the skull, and, rebounding, lodged in the brain.

The other case was that of a soldier, who received an injury to the cranial bones from a bullet, and a compound fracture of both bones of the leg at the lower third, caused, as he supposed, by the explosion of a shell. He came under observation a month afterwards. He stated that a surgeon on the field had seized the ball with a pair of forceps, and, pulling with all his force, could not extract it. Amputation of the leg was found necessary, and while he was unconscious Dr. Hutchinson examined his head, and removed several loosened pieces of necrosed bone from the upper and posterior angle of the right parietal. A piece of ball of a very irregular shape was also removed. This appeared to be lying in the cerebrum, and its removal was followed by the discharge of about 3ij of healthy pus from an abscess in the substance of the brain. He recovered without any unpleasant symptoms; and 9½ months afterwards "the opening in the cranium was nearly closed by a deposit of new bone, the pericranium having been left at the time of the operation."

Dr. Ashurst communicates to the 'American Journ. of the Med. Sciences,' Oct. 1865, p. 383, some cases of gunshot injury of the head, in order to show that even in these injuries, in which trephining is usually represented as especially indicated, the patient has really a better chance without it. The cases are 5 in number, 3 of gunshot fracture and 2 of contusion; 1 out of each class recovered. Death resulted in one of the cases of fracture from lodgment of a portion of the ball, which had been cut into two pieces by the bone, so that a portion remained in the brain after the apparent escape of the missile; in the other, from the extent of the injury, and of its sequelæ. In the case of contusion of the bone which died death was produced by meningitis of the *opposite* side. The conclusions which Dr. Ashurst draws are as follows:

1. In the large number of cases which die under conservative treatment it does not appear from the autopsies that the use of the trephine could, in any way, have averted the fatal issue.

2. Many cases which recover without trephining would be seriously jeopardised by rashly admitting the atmosphere to the torn and bruised cranial contents, and thus placing them in the unfavorable condition of an open wound, instead of leaving them in the safe position of a subcutaneous or, more strictly, "subosseous" injury.

3. In those cases which recover after the use of the trephine the instrument does not deserve the credit of the cure; for if there be already an opening through the skull the operation is unnecessary, and if there be not it adds to the already serious injury a most dangerous complication.

4. There is a close analogy, though often forgotten, between trephining and the resection of long bones. In compound fractures of the extremities we extract loose fragments, restore the others as nearly as possible to their proper places ("setting" the fracture) and then trust the case to nature. Just so in compound fracture of the skull, we should content ourselves with removing the detached portions of bone, and restoring the rest, if possible, by the elevator or otherwise, to their proper level, and then withhold our hands.

Mr. Teevan has published, in the '*Brit. and For. Med.-Chir. Rev.*,' July 1, 1865, "An Inquiry into the Causation, Diagnosis, and Treatment of Fracture of the Internal Table of the Skull." Mr. Teevan speaks only of those cases in which the internal table is fractured, without any injury whatever of the external, excluding those more numerous instances in which the external table is simply fissured, while the internal is splintered, and perhaps depressed. He first establishes the reality of the injury by references to published cases and to pathological specimens, of which latter he has only discovered two—one in the Musée Dupuytren at Paris, and the other at Netley. The explanation of the injury previously admitted is rejected by Mr. Teevan. On this subject the author speaks as follows:

"Sir B. Brodie's words express the English belief:—'The greater elasticity of the outer table of the skull, and the greater brittleness of the inner table, seem to afford the only reasonable solution of these phenomena.*' It will thus be seen that all surgeons assign, as the cause of this fracture, the greater brittleness of the inner table, and Dr. B. Beck gives an additional explanation—its shortness.

"I will now show that the cause of this fracture is not to be sought for in any of the reasons given, but that it occurs in obedience to a well-known physical law—that fracture commences in the line of extension, not that of compression.

"If it were true that the shortness and brittleness of the inner table were the cause of its fracturing, then it would follow that, if violence were applied to the inner surface of the skull, it would be impossible to produce fracture of the external table only, without any injury whatsoever to the inner. Now, what are the results of my experiments on this point? Why, they show that, if the inside of the skull be struck,

* '*Med.-Chir. Trans.*, xiv, p. 331.

the external table can be fractured without any injury whatsoever to the internal table—thus proving that the alleged shortness and brittleness can have nothing to do with the causation of this fracture. I give the following details of an experiment, which any one can, with a little practice, perform. A skull-cap, stripped of all its soft parts, with a wet cloth inside it, is to be laid with its convexity in the palm of the left hand, which is to be protected with several layers of a moist cloth, to obviate an inconvenient amount of pain. If the inside of the skull be now struck by a hammer, with a slight degree of force, fracture of the external table will be produced, without any fracturing or fissuring of the inner. I have performed this experiment several times, and exhibited some of the specimens at the Pathological Society. I would here refer to a specimen, which is quite unique, of a certain fracture of the skull, which has never been described by any surgical writer. In Guy's Hospital Museum, No. 1082⁷⁰, there is a calvarium of a man who committed suicide by shooting himself. The bullet entered the skull in the right temporal region, traversed the brain and its membranes, struck the inside of the left part of the frontal bone, and remained imprisoned in the cranial cavity. At the spot on the inner surface of the left frontal bone, where the bullet struck, there was a black mark, but no fissure nor fracture, but at the corresponding point outside there was a starred, fissured fracture of the external table only. Here, then, was produced, accidentally, a similar kind of fracture to that which I had caused experimentally.

"Thus, therefore, whether the inside or outside of the skull be struck, fracture of the distal table only, without any injury to the proximal table, can be produced in either case.

"I will show the causation of the above facts.

"If a stick be bent across the knee, until it commences to break, it will be found that the fracture begins, not at the spot where the knee is applied, but at a spot exactly opposite on the other side, and the fracture commences there in obedience to a well-known physical law that, when pressure is applied to a body till it breaks, the fracture commences in the line of extension, not that of compression. Now, when a stick is bent, the atoms along the proximal curve at which the pressure is applied are brought nearer together or compressed, and the atoms along the distal curve are separated or extended; therefore, if the pressure be continued till the stick breaks, it follows that the rent or fracture must commence at that spot in the distal curve where the greatest extension is going on, which point will be found exactly opposite to where the pressure is applied."

On the question of diagnosis, Mr. Teevan writes as follows:

"I will enumerate those symptoms which are sometimes diagnostic of the occurrence of fracture of the internal table only, but it is very rarely, indeed, that its existence can be absolutely determined.

"If a person, after receiving a blow of the description I have already mentioned, should, in the course of some days, or weeks, begin to complain of a fixed pain at the spot struck, and be finally attacked with encephalitis, we may conclude, if on examination no injury can be detected to the bone struck, that some spiculae of the inner table, or

the ragged edges of the fracture, are scratching the membranes, and giving rise to an amount of mischief which will very probably terminate in intra-cranial suppuration. No acute symptoms may, perhaps, arise in a given case, but it may degenerate into chronic cerebral irritation. In those cases where the symptoms of the formation of pus are well marked, with paralysis of the side opposite to that struck, tho diagnosis would be very probable.

“When compression of the brain is caused by a depression of the internal table alone, the patient may become insensible on the receipt of the blow, and remain so. There would be paralysis, more or less, of the side opposite to that struck, but generally the symptoms of compression are not well marked. There might, or might not, be a scalp wound, but there would be no injury whatsoever to the external table; if there was a fissure the case would be one of complete fracture of both tables, with depression of the inner one only. Now, if the patient was insensible from the first, it is evident that the above symptoms might result from an intra-cerebral extravasation of blood on the side on which the blow was received, and hence a diagnosis would be impossible. But it must be recollected that the compression produced by depressed bone is rarely so complete as that caused by an extravasation of blood, and that when the internal table only is depressed the symptoms of compression will not be nearly so strongly marked as when both tables are driven into the brain. Hence, the less definite the symptoms of compression, the greater the reason to believe that they are caused by the internal table only.

“There are two cases in which the diagnosis may be made with almost certainty. First, when a person recovers immediately after the blow, but finds there is paralysis of some part of the body opposite to the side struck, and examination fails to detect any injury to the bone; secondly, when, after the blow, no evil consequences arise at first, but in the course of time the patient begins to complain of fixed pain in the part struck, and all the symptoms of chronic cerebral irritation show themselves, although the surgeon cannot find any injury to the external table.”

The treatment is thus summarised :

“I have already stated that the effects produced by a fracture of the internal table are most likely to be similar to those caused by the punctured fracture, but we cannot thereupon follow the treatment adopted in the latter case, inasmuch as fracture of the internal table can never be seen on its immediate occurrence, but only suspected at a later period by the advent of certain symptoms. Hence, the urgency, or persistency, of the symptoms can alone justify the use of the trephine in suspected instances of fracture of the internal table; consequently a surgeon would be warranted in trephining, on the spot struck, if all the symptoms of intra-cranial suppuration were well marked, and there was paralysis of the side opposite to the injury; so also if the violence had been applied in the course of the middle meningeal artery, and the symptoms of compression were urgent and persistent, together with paralysis of the opposite side; and, likewise, if the patient had been insensible from the first, with obstinate symptoms

of compression and paralysis of the side opposite. It happens sometimes that a patient is never rendered insensible by the blow, but finds he has paralysis of some part of the side of the body opposite to that struck. Now, if in the course of some weeks the paralysis does not disappear, the use of the trephine, to the part struck, would be indicated."

In the 'St. George's Hospital Reports,' i, 25, Mr. Prescott Hewett describes the remarkable deviations of the base of the skull sometimes found in chronic hydrocephalus. He calls attention especially to the diagnostic signs furnished by the deviation of the orbital plates, which when driven downwards, in a case of hydrocephalus, so as to displace the eyes, furnish a clear proof that the dropsy is in the ventricular cavity, and not merely in the sac of the arachnoid, although the converse assertion cannot be sustained, for ventricular dropsy may occur without this symptom. Mr. Hewett then proceeds to comment upon some singular cases of deviation of the base of the skull in the middle fossæ, whereby a pouch containing fluid was found in the cheek. The origin of such pouches Mr. Hewett shows to be in the descending horn of the lateral ventricle, upon which the dropsy has principally pressed; and he cites a case from G. Vrolik, in which this portion of the ventricle was cut off from the common cavity and dilated, forming an expansion in the corresponding part of the skull. The paper concludes by a remark, that this pouch-like expansion in the cheek might ossify, as occurs in the expanded vault of dropsical skulls, and then a bony capsule might be formed, the existence of which it would otherwise be difficult to explain.

The following refer to affections of the ear:

Dr. Bishop, 'On a New Method of applying Remedial Agents to the Cavity of the Tympanum.' London, 1866.—In this pamphlet Dr. Bishop describes an apparatus which he has had constructed for the purpose of injecting pulverized liquids into the cavity of the tympanum—a method by which he has succeeded in relieving deafness in several cases, when depending on a morbid condition of the mucous membrane of the fauces spreading into the tympanic cavity. Nitrate of silver, liquor potassæ, and tincture of iodine, are the solutions which Dr. Bishop recommends in appropriate cases. The apparatus consists of a small graduated glass syringe, similar to that used for subcutaneous injection. The solution is gently forced *guttatim* into a cylinder, and at the point where it leaves the nozzle of the syringe it is caught by a current of air sent by a pump worked with a proper degree of force by the hand. This drives the fluid forward in a pulverized state. This small apparatus is then attached to an ordinary Eustachian catheter, previously introduced, and suspended by a suitable apparatus. To ensure complete pulverization, the end of the catheter is covered by fine gauze wire.

Dr. Bishop believes that insufflation or injection of fluids into the tympanum is quite safe in the hands of experienced persons, and is necessary in the treatment of many of the affections of the middle ear.

In the 'Gaz. des Hôp.,' Sept. 7, 1865, M. Triquet calls attention to

the fact that the *membrana tympani* may sometimes be reproduced after its partial destruction. He says, "the two lateral and the inferior segment may have completely disappeared, and the tympanum be exposed to view; . . . but if the superior segment of the membrane, formed (as is well known) by a triangular band of the skin of the auditory canal, is intact, or nearly so, and the handle of the malleus, in spite of these extended ravages, is still in position, the membrane may be reproduced." The reproduced membrane has not the brilliancy, the polish, or the perfect form of the original *membrana tympani*; its external face is not concave, but plane; it is no longer transparent; the handle of the malleus is in its usual position, but swollen and rough. The hearing is weakened.

M. Triquet adds some details of one or two cases in his practice in which this reproduction has been observed.

Gruber, "On the Treatment of Catarrh of the Middle Ear," in 'Deutsche Klinik,' 1865, p. 357, first remarks on the innocuity of injections into the tympanum, an operation which he says he has practised at least 20,000 times (though not on 20,000 patients) without the least difficulty or evil consequences. But when the inflammation is merely a part of general inflammation of the mucous membrane of the nose and pharynx, he recommends a course of treatment somewhat like that of Dr. Thudichum (see p. 235 of this Report), by injecting a good quantity of fluid into one side of the nose with a syringe exactly fitting the nostril. The patient, he says, will instinctively close the pharynx by means of the soft palate, and the fluid will run out of the other nostril, which it should only be allowed to do gradually. That it also penetrates into the Eustachian tube and tympanum is proved both by the patient's sensations and by the fact that when perforation exists in the *membrana tympani* the fluid will run out. If (as will sometimes happen) the patient, especially a child, makes violent efforts to swallow while the injection is going on, it will sometimes rush out of the perforated *membrana tympani* with sufficient force to carry along with it masses of adherent extravasation. In children the Eustachian tube is more horizontal, and the fluid finds its way into the ear much easier than in adults.

The cases in which he recommends this treatment are as follows:

1. All cases of acute or chronic catarrh of the tympanum which are complicated with catarrh of the naso-pharyngeal mucous membrane.
2. All diseases of the middle ear (suitable for treatment by injection) which occur in the course of ulcerative processes in the naso-pharyngeal region.
3. All those catarrhal and ulcerative processes which have their special seat near the pharyngeal opening of the Eustachian tube, and produce its closure by thickening of the membrane.
4. In all cases where injection of the tympanum is desirable, but a catheter cannot be passed.

In the 'New York Medical Journal,' March, 1866, p. 424, Dr. B. St. John Roosa relates four cases of bony growths in the *meatus auditorius externus*. In all these cases the growths had much encroached on the canal, so as to impair the sense of hearing to a great extent. In one the patient died from suppuration in the tympanum, extending to

the brain, the pus having been prevented from escaping externally, as was believed, by the bony growth. The growths did not appear to have the nature of tumours, or exostoses, so much as that of periosteal deposit from local irritation, the source of irritation being in almost all cases the contact of pus passing from the middle ear. Dr. Roosa dissents from Mr. Toynbee's opinion, that they are usually the result of the rheumatic or gouty diathesis. This certainly could not be said of any of the cases here given, and the limitation of the disease to the ear is another argument against that view. The author refers to an article on the subject, by Prof. Welcke, of Halle, in the 'Archiv f. Ohrenheilkunde,' Band. i, Heft iii, 1864, who believes such growths to be more common in transatlantic, especially aboriginal, than in European races. As to the treatment, the author thinks prophylactic measures are more promising than curative. "Constitutional treatment is of no avail, and, thus far, local means have not accomplished much. If the primary disease of the ear be attended to, the growths will not occur."

The following extracts refer to the surgery of the vascular system :

"Respecting Rupture of the Axillary Artery in reducing Dislocations at the Shoulder-joint." By Geo. W. Callender ('St. Bartholomew's Hospital Reports,' ii, p. 96).—Mr. Callender gives the history of a remarkable case which fell under his own care, in which a dislocation of the shoulder had been reduced without any difficulty soon after the accident, but had been reproduced by incautious passive motions too early after the injury. The patient was again operated on 6 weeks after the original injury. The head of the bone was in the axilla. Chloroform was administered, and reduction was attempted ineffectually, at first with the heel in the axilla, then by extension directly forwards, but without effect. Mr. Callender then sought to reduce the humerus by circumduction, to which end the arm was made to describe a half circle over the face and head. In moving the arm after this fashion, with the exercise of very slight force, as it passed over the patient's head the humerus was felt and heard to enter the glenoid cavity, and the dislocation was found to be reduced. A swelling, due to effused blood, was now observed to rapidly increase under the pectoral muscle. This was thought to be produced by the rupture of a vein, as the pulse was still natural in the radial artery. When the man recovered from the chloroform he did not complain of any pain. The progress of the case, however, was so unfavorable that Mr. Callender was induced, about 6 weeks after the reduction, to cut into the swelling and attempt to discover the vessel which was injured. All this time there was no symptom of aneurism, in the proper sense of the term (*i. e.* no bruit or pulsation, or limited tumour), and the pulse at the wrist was still natural. The operation consisted in an incision along the lower border of the pectoralis major, crossed by one running upwards through the whole substance of the muscle. When the great cavity thus opened was cleared of blood, some clots were seen below the pectoralis minor. These clots were scooped out, and then arterial bleeding occurred. Then the pectoralis minor was divided, and pressure on the axillary artery on both sides restrained the flow of blood. Now a hole was seen

in the upper wall of the axillary artery, which was tied on both sides of the hole and divided. Thus the bleeding was effectually restrained, but gangrene of the arm came on, and proved fatal.

In his remarks on this case Mr. Callender refers to 31 instances of rupture of the axillary artery. Seventeen of these occurred in the reduction of dislocation. Of these, 5 are dubious, or imperfectly recorded; in 5 undue violence was used; in 2 the dislocation was complicated with fracture, so that it is possible that in the efforts at reduction the artery might have been injured by the edges of the fractured bone. In the remaining 5 (including Mr. Callender's own case) no great force was used, nor any unusual difficulty experienced.* The other 14 cases were instances of rupture of the artery from various injuries not producing dislocation.

A patient was twice exhibited to the New York Pathological Society by Dr. Krackowizer, first in Sept. 1861, and again in March, 1865, to show the possibility of a spontaneous cure of aneurism by anastomosis, or cirroid aneurism as it is here denominated. When first exhibited the patient was 45 years of age, had had the disease all his life, and could refer it to no cause. It had never caused pain or hæmorrhage, but was of considerable size, and involved the right ear and scalp in the position of the temporal and posterior auricular arteries and their branches. He suffered from rushing noise in the ear, which was continual. On the second occasion the disease had diminished in all its parts. Pulsation in some parts had entirely disappeared, and the anfractuositities of the large arteries had become in some parts quite solid; the ear had greatly shrivelled up; the pulse in the posterior auricular artery had become feeble, and two thrombi of different thickness could be felt in its interior. The change had been in progress about a year. At that time, if he kept quiet, the rushing noise was not audible.

Dr. Krackowizer refers to two other cases of spontaneous cure of cirroid aneurism (both, however, of traumatic origin) as recorded by Glück and Orfila, and by Chevalier of Paris, but he does not give the references.

In the 'American Journal of the Med. Sc.,' Oct. 1865, p. 535, a case is cited from the 'Canada Med. Journ.,' Oct. 1864, by Dr. Sewall, of the cure of an aneurism of the carotid artery by starvation, rest, and iodide of potassium. The patient, a man æt. 24, was suffering from a large diffuse pulsating swelling occupying the whole side of the neck as high as the level of the hyoid bone. The aneurismal thrill was very manifest, and the sounds of the heart were heard loudly in the tumour. The tumour interfered with respiration. Absolute rest in bed was enjoined, 8 oz. of white bread and 1 pint of water daily was allowed, and 5 grs. of iodide of potassium given in an ounce of water 3 times a day. In 3 days the part of the swelling in front of the sterno-mastoid had disappeared; in 9 days there was merely a tumour the size of a

* Mr. Callender believes that the cases spoken of by French surgeons as "tumeur aërienne" in reduction of the shoulder were of the same nature as his own.

hen's egg, dipping under the sterno-mastoid muscle, no longer diffused, but much firmer and with impulse and sounds diminished. In 28 days the swelling was reduced to the size of a hazel-nut, and in 15 days more all trace of the aneurism was gone.

He remained on the diet above specified from March 9 to April 1, when it was increased to 12 oz. bread, $\frac{1}{2}$ pint milk, and 1 pint water. On the 6th he was allowed to get up. On the 21st the cure was complete, and he was released from all restraint as to diet and exercise. "There was considerable loss of weight, but the emaciation was confined almost entirely to the muscles. Before taking to bed the muscles were hard and salient, but at the end of 3 weeks, when the diet was first increased, the limbs were round and soft like a woman's." This is explained by the high temperature maintained in the room, according to French Canadian custom. The patient was heard of 4 months afterwards in good health.

Dr. Owen Rees published in the 'Lancet,' 1865, i, p. 280, an account of a case in which a popliteal aneurism became consolidated, and was perfectly cured, while the patient was under the constitutional influence of the acetate of lead. Dr. Owen Rees states it as his object in publishing the case, "that the fact I have observed may assume its proper value, and be regarded either as a mere accident or as an effect of the treatment employed." The patient, a man æt. 27, was admitted into Guy's Hospital under Mr. Poland's care, and transferred to Dr. Owen Rees expressly to try this treatment. The aneurism was then of the size of a duck's egg, its contents perfectly fluid, and the walls so thin that rupture was apprehended. There was a distinct bruit, and the opening of the artery into the sac was thought to be of large diameter. "Arrangements were made to commence compression at once, and a failure ensued. Deligation of the artery to be performed."

On being transferred to Dr. O. Rees's care, Oct. 29, he was ordered 3 grs. of acetate of lead and 1 gr. of opium powder 3 times a day, to have full diet and a chop for breakfast. On Nov. 5 the quantity of the acetate of lead was increased to 5 grs. He remained under this treatment till Dec. 2, when he was obliged to discontinue the lead on account of the colic which it produced. During the latter part of this period the tumour had been getting larger and harder, apparently from the deposition of fibrine, and on Dec. 12 it is noted that the pulsation had ceased, and the articular arteries were soon after seen to pulsate. He left the hospital on Dec. 31, but presented himself again on Jan. 17, and the reality of the cure was certified by all the surgeons of the hospital.

The inconveniences produced by the lead were trifling; the man would not submit to rest in bed, but walked about the ward, and had on one occasion danced to amuse his comrades. His system appeared still charged with the lead when he was last seen, as the blue line was still round his gums. Dr. O. Rees is of opinion that in such cases, if the aneurism should begin to consolidate, no more lead need be given, as the patient's system is charged with the drug and coagulation will then go on of itself.

In the 'London Hospital Reports,' iii, 179, Dr. Daly relates a "Case in which the symptoms of a large Abdominal Aneurism were present, and cure resulted."

In this case the patient, a man *æt.* 38, who had been suffering from dysentery, presented a pulsating tumour 2 inches below the ensiform cartilage, about twice the size of the fist. The tumour had the bruit and all other symptoms of aneurism, and was referred to a strain a few days previously. He was kept at rest in bed—in a state of absolute rest, scarcely allowed to speak—on a nourishing unstimulating diet, with as little fluid as possible. Ice was kept constantly applied to the tumour, and the diacetate of lead was given in 3-gr. doses with a quarter of a grain of opium 3 times a day. After 15 days it was necessary to discontinue the lead on account of the loss of appetite and constipation, but the ice was continued. After a fortnight's interval the bruit was no longer audible, though there was pulsation. The lead was resumed and continued for 12 days, when it was necessary to give it up on account of the constipation, causing obstruction and vomiting. When he recovered from this, at the end of a week, the aneurism was found to be cured. The ice had been continuously applied for 2 months with no pain or tendency to sloughing. The patient was seen 5 months afterwards, and there was then no tumour to be felt.

Extract of a clinical lecture by Dr. O'Ferrall, "On the combination of Distal with Proximal Compression in certain cases of Aneurism." (From the 'Dublin Medical Press,' Mar. 15, 1865, p. 250.)—"I have long been of opinion that compression of an artery on the distal side of an aneurismal sac should precede or accompany that on the cardiac side of the aneurism. I have often observed arrest of pulsation easily accomplished, attended at the same time with a flaccid state of the sac; but I have also remarked in such cases that the moment the pressure ceased the sac filled and throbbed as before. The formation of the coagulum is thus desirable as the first step to consolidation. A half-empty sac is the ready recipient for the slightest thready current that can follow the cessation of the compressing force on the cardiac side. It therefore appeared to me advisable to interrupt the current only when the sac was full of blood. These considerations, together with the knowledge of the fact that ligature of the artery on the distal side has sometimes cured an aneurism when the upper or cardiac portion of the vessel could not be reached, made me resolve to try this expedient whenever a fair amount of pressure was not followed by success. From what I have observed I am inclined to think that cessation of pulse in a sac which suddenly diminishes in size and becomes flaccid is less likely to be followed by a permanent cure, whatever time may have been occupied in the compression; and that a sac which retains its volume, and is, moreover, permanently full of coagulum, is less likely to be re-filled, however short the duration of the compressing force. I have no doubt that, whether a sac be filled by fibrinous deposits of some duration or by coagulum recently formed, a full sac is very influential in preventing the ingress of blood from a compressed artery above or collateral branches from below. The compression below the sac need not

in some cases last more than a few minutes before the current above is stopped. If, on making the pressure above and arresting the pulsation, the sac remains full, the object is attained, and time is merely required to allow the blood then liquid to coagulate in the sac. In other cases it may be prudent to continue both compressions for a longer time."

Dr. Mapother, "Case of Ilio-femoral Aneurism cured by Pressure on the Common Iliac and Superficial Femoral Arteries, under the influence of Chloroform." ('Dublin Med. Press,' Mar. 29, 1865.)—In this important paper Dr. Mapother relates the history of a successful attempt to extend the treatment by compression to aneurism within the belly, as had been done in the case under the care of Dr. Murray, of Newcastle-on-Tyne, of which an abstract will be found in the 'Year-Book' for 1864, p. 122. Dr. Mapother also refers to a case under the care of Mr. Heath, of the Newcastle Infirmary, where the aorta was successfully compressed for 7 hours under chloroform, on account of an aneurism of the external iliac. In Dr. Mapother's case, which appears to have been an aneurism of considerable size, involving the external iliac and femoral, an unsuccessful application of pressure with the thumbs and a compress by a relay of students, on the common iliac artery as it passes over the 5th lumbar vertebra, was first tried for 6 days and nights, with the exception of 4 hours' rest in the 24, the sensibility being blunted by opium, and large doses of tannic acid and bromide of potassium being given. After this had failed instrumental compression on the right common iliac artery (about one inch below and half an inch to the right side of the umbilicus) was kept up under chloroform for 12 hours, from 8 a.m. to 8 p.m. About 7 p.m. severe vomiting came on, followed by frequent rigors. Accordingly the administration of chloroform was suspended, and then the patient immediately found the pressure intolerable, so it had to be withdrawn. No effect was produced on the tumour.* The patient was left very prostrate and discouraged, and a red painful patch on the skin was caused by the compression. Five days afterwards a fresh and successful attempt was made to cure the disease. The bowels and bladder were previously emptied; a roller was tightly applied to the affected limb to facilitate the return of the venous blood and prevent œdema. The patient was brought fully under chloroform. A horse-shoe instrument (Signorini's tourniquet) with an appropriately shaped pad was applied one inch above the umbilicus, and therefore to the end of the abdominal aorta. Skey's tourniquet was placed on the common femoral artery, just as it quitted the sac. Pressure was commenced at 9 a.m., and for the first 2½ hours the pulsation was occasionally reproduced by the patient shifting his position. After this time, the compressor having been secured by bandages and pads, no more pulsation appears to have gone on in the tumour, although, as the femoral artery on the sound side pulsated, the aorta could not have been compressed.

Dr. Mapother accordingly concludes that the pad had been shifted on to the upper end of the right common iliac, which in that case must

* It should be noted that the stoppage of the circulation was never complete for more than a few minutes, from the difficulty of applying the instrument and the movements of the patient.

have arisen higher than usual. After the maintenance of pressure for four and a half hours without interruption, the instrument was removed and the tumour found to be solid and pulseless. The man had two severe rigors, but they were relieved by the administration of brandy and external warmth. Nervous pains were complained of for a day or two in the course of the musculo-cutaneous and long saphenous nerves, and a carbuncle formed at the seat of the first compression; but with these slight drawbacks the case went on completely well. The limb was warm and well nourished, and the aneurism completely solidified.

Dr. Mapother dwells upon the 3 following points:—1. The desirability and advantage of administering chloroform during the whole period of compression. He denies that chloroform has any effect on the blood unfavorable to coagulation. 2. That pressure on the cardiac side of the sac should be preceded and accompanied by pressure on the artery leading from the sac. This step was suggested by Dr. O'Ferrall. By this method the blood is retained in the sac and at rest, one of the most favorable conditions for coagulation. Before and for some time after ligature of a large vessel distal pressure would in a similar way prove valuable. 3. That the cure was affected in so short a period as $4\frac{1}{2}$ hours, the sac having been kept full by distal pressure.

Dr. Mapother concludes as follows:—"If I suffered from an external aneurism, after having used digital pressure for a couple of days to enlarge the anastomosing vessels, I would submit to complete pressure above and below the sac, under the influence of chloroform. Before I was exhausted by pain and confinement, and while my blood was healthy and plastic, I would hope for coagulation within the sac in a few hours, while those who advocate occasional and partial compression, and who hope for fibrous lamination, calculate the average period of cure as 25 days."

Mr. Eck relates, in the 'St. Bartholomew's Hospital Reports,' ii, p. 190, another case (under Mr. Holden's care) of the successful treatment of aneurism of the right common and external iliac and femoral arteries, by pressure on the abdominal aorta. The man, 40 years of age) had noticed a beating in the groin for two years, which had come on suddenly after a violent exertion. The aneurism had been twice under treatment by pressure, applied on one occasion to the common iliac artery for an hour daily during 6 weeks, combined with low diet; and on the second by tourniquets over the common iliac and femoral artery for 3 hours and 2 hours, at an interval of a fortnight. Each of these attempts seemed to have been beneficial, though not curative. The tumour was large, with a loud bruit, much swelling and stiffness of the limb, the veins of which were varicose—obstructive and regurgitant disease of the aortic valves, with hypertrophy of the heart. He was extremely emaciated, and out of health. Having been kept in bed and on liberal diet for about a fortnight, and the bowels having been well cleared out, pressure was applied by Lister's tourniquet over the bifurcation of the aorta, so as to control only the passage of blood through the right common iliac, leaving the left as far as possible free. After an hour it was found necessary to administer chloroform; but after an hour and a half, during which he was kept almost continuously under

its influence, it was found necessary to suspend the narcotic, in consequence of embarrassed breathing and intermitting pulse. A little chloroform was cautiously administered during the rest of the operation. Pressure was finally suspended after 4 hours' duration. He had then become very faint, with hardly any pulse. The effect of this was greatly to diminish the pulsation and impulse of the tumour. At the date of the report it is said, "The tumour seems to be consolidating, and is less in all its measurements by more than one half than when noted on the day of his admission. Pulsation, which was plainly visible through the walls of the abdomen, can only be felt by making deep pressure with the finger in the iliac fossa." The volume of the limb had become nearly natural, the varicose condition of the veins had nearly subsided, and the man could walk easily and without fatigue. He was in good health and condition, and no longer sensible of the beating in the groin.

"Ligature of the Left Common Iliac Artery, being the second operation in Ireland, and the first successful case of it." [In a case of arterio-venous aneurism.] By William Hargrave, M.B., &c. Dublin, 1865.—This case of Dr. Hargrave's may be referred to in connection with Dr. Mapother's case, as illustrating the feasibility of the treatment by prolonged compression under chloroform, even in internal aneurism, although that treatment was not successful in the present instance.

We quote the following short summary from Dr. Hargrave's pamphlet:—"The following table expresses very accurately the times and manner of compression up to a short time prior to the operation:—Dr. Carte's apparatus [upon the common iliac artery] from Dec. 26 to Jan. 9, 1865. Conical leaden 7 lb. weight [on the aneurismal tumour], from Jan. 19 to Feb. 11. Carte's apparatus reapplied for 24 hours and 40 minutes without intermission, Feb. 13.* This apparatus with the 7 lb. leaden weight to Feb. 26. From this date L'Estrange's clasp and digital pressure to March 10. From this date L'Estrange's clamp applied [to the abdominal aorta], combined with digital compression to the 18th of April.

"The medical treatment comprises the Liq. Pernit. Ferri, substituted for the Sol. Ferri. Perchloridi; it changed for Hydroid. of Potash, which was discontinued, and the Acet. Plumbi with Opium ordered. The limited diet prescribed on his admission was augmented considerably one month after it, and continued so up to the operation; in fact, full diet, alternating with wine and porter, according to circumstances."

Dr. Hargrave also says—"The double combined compression—that on the cardiac side of the tumour, and on the distal side of it on the femoral artery—was of no benefit to the aneurism, but, in my judgment, was injurious to the patient, as it increased the œdema of the inferior extremity." Digital pressure was used with success, as far as stopping the circulation through the tumour; but though the flow of blood was

* It is apparently to this date that the following sentence of Dr. Hargrave's report refers:—"Chloroform was subsequently administered, for hours being fully under its influence, equally unprofitable in any way affecting the tumour."

entirely suspended in the aneurism for 50 consecutive hours, and the pressure was afterwards persevered in for 5 continuous days, no satisfactory result ensued.

At the operation the peritoneum was found in no degree adherent, the previous pressure having left it quite unaffected. The artery was tied on April 29. Pulsation recurred in the aneurism from the 9th to the 13th day after the operation, when it ceased, but recurred on the 22nd day, and occasionally afterwards. The ligature separated on the 29th day, proving, as Dr. Hargrave says, "the success of the operation on the artery." Gangrene, however, declared itself on the 31st day, and the patient, after lingering till the 73rd day, died of abscess around the nates and occasional arterial hæmorrhage; so that, in ordinary language, the operation would not be spoken of as successful. On examination after death the aneurism was found to affect the external iliac artery, and to communicate with the external iliac vein. There was no formation of laminated coagulum.

Dr. Hargrave concludes with expressing his preference for the hemp ligature over all other substances—catgut, lead, metallic, silk, and others—"for the firm way in which it remains on the artery, the complete absence of irritation, and no alteration in its strength and soundness."

With respect to the treatment of aneurism of the innominate artery, an important case has been put on record, and related to the Royal Med. and Chir. Society, by Mr. C. Heath, which occurred at the Westminster Hospital, in Nov. 1865, under his care, and in which he tied simultaneously the right subclavian in the 3rd part of its course, and the right common carotid simultaneously. The case is recorded in the 'Med. Times and Gaz.,' Jan. 5, 1867, and will probably be published more *in extenso* in the 50th vol. of the 'Med.-Chir. Trans.' The operation was successful, so far as arresting the growth of the tumour, which before was threatening to burst into the trachea, and was making some progress towards the nerves of the brachial plexus, and the patient was presented to the society a little more than a year after the operation, in fair general health, and with only slight pulsation in the tumour. This is believed to be the first case in which the two arteries have been tied simultaneously and the patient has survived; but a table of the cases of double ligature will, it is expected, be found appended to Mr. Heath's paper. The success of this formidable operation in the case in question, in prolonging, if not in saving, the patient's life was certainly very marked.

In connection with the treatment of innominate aneurism, we may mention that we have received from New Orleans the account of the very remarkable case in which the innominate and the vertebral arteries were both tied in that city with success in a case of aneurism of the first part of the subclavian or of the end of the innominate artery. As the case was referred to in the 'Year-Book' for 1864, we do not include it in the body of this report; but its unique interest renders it an object of so great surgical interest, that we present the original authentic account of it entire to our readers in an appendix, which will be found at the end of this report.

"On Vascular Protrusion of the Eyeball." By Thomas Nunneley, F.R.C.S., of Leeds ('Med.-Chir. Trans.,' xlviii, p. 16).—In this paper Mr. Nunneley continues the communication which he has already made in a previous volume of the 'Transactions' on those cases which were originally described by Travers as aneurisms by anastomosis within the orbit, and which have since (chiefly on the authority of Mr. Busk and Mr. Curling) been commonly received as true aneurisms (whether spontaneous or traumatic) of the ophthalmic artery in the orbit. Mr. Nunneley's object, in the present paper, is to show that "in the great majority of such cases there is no disease whatever in the orbit; the seat of it is most commonly intra-cranial. The protrusion of the eyeball is passive, and the other distressing symptoms are secondary, depending upon obstruction to the return of blood through the ophthalmic vein, just as happens in those cases of popliteal and axillary aneurisms where the limb swells below the tumour, because this presses upon the accompanying vein. That this pressure, in the great majority of acute spontaneous cases, is caused by an aneurism of the carotid as it emerges into the cranium, or of the ophthalmic artery near to its origin, is, I think, now certainly proved. In cases of traumatic origin, supervening soon after severe injury to the head, the cause is, most probably, effused blood near to or within the cavernous sinus, while in those cases where the protrusion does not come on till some time after the receipt of the injury it may be serum, or fibrine, or even pus, the result of suppuration in the sinus."

Mr. Nunneley gives four cases of his own, upon which he bases this opinion. In the first, however, the operation of tying the carotid was successful and the patient is still in good health, and in the second all treatment was declined, so that no positive information is obtained from these cases. In the third the patient died about a year and a half after the ligation of the carotid. The disease proved to be a malignant tumour, affecting the bones of the skull, filling the orbit, and obliterating the cavernous sinus and ophthalmic vein. The fourth case is the account of the post-mortem examination of a patient on whom Mr. Nunneley had tied the carotid for this affection five years previously. The disease proved to be intra-cranial aneurism of the ophthalmic artery, with no visible disease in the orbit. Mr. Nunneley also refers to a well-known case in which Mr. Bowman tied the carotid artery for a supposed aneurism, and where, the patient having died from the operation, no disease was found except suppuration in the cavernous sinus.

Mr. Nunneley remarks upon the frequency with which bronchocele exists in these cases of vascular protrusion of the eye.

Mr. Nunneley concludes by calling attention to the fact that "in the only 4 cases where post-mortem examinations have been made no tumour, aneurismal or otherwise, has existed in the orbit. . . . We cannot rely too much upon Mr. Guthrie's case, where the symptoms during life are not very distinctly set forth."

In the more acute cases Mr. Nunneley believes that the carotid should be tied, and mentions that he has performed the operation 6 times, and in 5 with success. Pressure on the carotid he regards with

little favour, though he admits that two cures have been obtained by this method.

Mr. Bryant reports, in the 'Medico-Chirurgical Transactions,' xlix, p. 175, a case in which the main artery of the limb had been tied for elephantiasis Arabum—or elephas, as Mr. Bryant prefers to call it—of the lower extremity. This is the first case so treated, as the author believes, in England. The patient was a single woman, aged 25, of healthy aspect, and who had enjoyed good health, except from an attack of scarlet fever two years before (but which had not been followed by any complication); the enlargement had, however, begun immediately after this, having increased rapidly after sleeping in a damp bed. The limb was much hypertrophied—"enormously enlarged" from the ankle to the groin)—and felt hard and brawny; but the skin was free from the cuticular induration and ulceration which is so frequently associated with this affection. The foot was perfectly sound. The measurements are given, showing an excess of $8\frac{1}{2}$ inches round the calf and 7 inches round the thigh on the affected side. After some preliminary treatment, which was ineffectual, Mr. Bryant tied the external iliac artery. The vessels appeared perfectly healthy, and of the natural size. Everything went on well after the operation. The ligature came away on the 15th day, and the girth of the limb diminished rapidly. This diminution progressed with the interruption of a temporary increase, due to exercise of the leg; and at the last note (half a year after operation) the girth of the calf had been diminished $7\frac{1}{2}$ inches from what it was before operation. The patient was, practically speaking, quite well, and was provided with an elastic stocking. Drawings of the limb, before and after operation, are given.

Mr. Bryant appends an abstract of the cases of elephantiasis treated in this way by Dr. Carnochan, of New York, 4 in number; 1 by Mr. Statham; 1 by Mr. Butcher; 1 by Dr. Fayrer, of Calcutta; and 1 by Mr. Alcock, of the North Staffordshire Infirmary.*

In the remarks appended to this case Mr. Bryant combats the idea that elephantiasis is due to disease of the venous system, to inflammation, or to disease of the artery; but appears to regard it as due to an excess of nutrition of the limb, leading to an abnormal effusion of tissue-forming elements, which is checked by the ligature of the main artery. But, whatever may be the theory of the disease, Mr. Bryant regards the practice as unquestionably successful and bold—that by this means "another triumph has been achieved for the science and art of surgery."

The following refer to affections of the intestines and to hernia:

In the 'New York Med. Journ.,' May, 1865, p. 106, is a paper by Dr. Hoyne containing some experiments which he made on the dead subject on bullet wounds of the intestine, both with round and conical bullets, fired from revolvers at short distances. In 4 experiments round

* As Mr. Bryant refers to these cases of elephantiasis treated by ligature of the main artery of the limb, it is to be presumed that his previous statement, that his case is "the first so treated in this island," must refer rather to the vessel tied than to the principle of the treatment.

balls were used, causing 16 wounds of the intestine, or 4 to each ball. In 14 experiments conical balls were used, causing 74 wounds, or 5.29 for each ball. On the whole, there were 5 wounds on an average for each ball. In 2 of the experiments the intestines were uninjured. The mesentery was wounded 14 times, and there was fæcal extravasation in 10 cases. The inference which Dr. Hoynes deduces is, that the advice of M. Legouest is very dangerous, to introduce the finger and move it about freely in the wound until the wounded intestine is found, when the external opening is to be enlarged, and the wounded intestine drawn out and sewn up. The fact that the intestine is always wounded at more than one point, and often at many points, renders it certain that this would cause extravasation.

Dr. Peaslee relates, in the 'New York Med. Journ.,' July, 1865, p. 258, a remarkable case of intussusception. The patient was a young lady, æt. 17, who, after numerous attacks of colic, vomiting, and hæmorrhage from the bowels, passed a mass of small intestine 5 feet long, with the mesentery 2 inches wide attached; and next day another foot of the same intestine. This was in the month of May. She gradually sank with exhausting diarrhœa, and other symptoms not necessary to describe, and died in September. The mass passed from the bowel was proved by naked eye and microscopical examination to be small intestine; but the fact that the girl was still alive, and also that the intestine came away right side out, and not inverted, inclined Dr. Peaslee to suspect it to be the intestine of some lower animal surreptitiously obtained and passed up the rectum. The fact of its having been passed by her per anum seemed to be established. On post-mortem examination the small intestine was found to measure only 16 feet. The duodenum and the upper five feet of the jejunum were very much hypertrophied, and at the lowest point much dilated. At the middle point of this hypertrophied portion (3 feet below the stomach) was a polypus as large as a pigeon's egg, and next below the dilatation was a stricture half an inch in length and only large enough to admit a small goose-quill. The remaining 10 feet of small intestine presented nothing abnormal, except a slight degree of atrophy. The large intestine, 5 feet 10 inches long, was extremely atrophied. The mesentery was smooth and apparently intact;* it was, however, hyperæmic, and its glands hypertrophied.

Dr. Peaslee believes (and in this he is supported by a committee of the New York Obstetrical Society, who examined the specimen, and report on it in the same volume, p. 371) that this was a genuine case of intussusception—that the attacks of vomiting were originally excited by the presence of the polypus, and that during these attacks the intussusception took place from below upwards—that the hæmorrhage depended on the strangulation and sloughing of the portions expelled—

* This is an error apparently in the report of the gentleman who made the post-mortem examination. A subsequent examination showed that at the seat of stricture "the mesentery was crowded in a thick fold into the intussusception, because the little piece of mesentery that was attached was more clumsy and massive than usual."—*Ibid.*, p. 380.

that the subsequent recurring attacks of vomiting and the atrophy of the large intestine were due to the stricture preventing the passage of food in any considerable quantity. Two explanations are suggested by the referees of the fact that the expelled bowel came away right side out—either “that the process of sloughing did not take place simultaneously with the whole of the tube, but ulceration first severed the returning piece of the invagination, so that it dropped over the inner layer, and became unravelled within the intestinal canal; or, that the invaginated mass protruded per anum, and that the mother of the patient, in attempting to withdraw the mass, took hold of this inner tube and unravelled it *in situ*.”

Colotomy.—In the ‘London Hospital Reports,’ ii, p. 6, Mr. Curling relates briefly the particulars of 4 cases in which he had opened the descending colon for the relief of the sufferings caused by painful cancer of the rectum, unaccompanied by total obstruction. In none of the cases was any serious difficulty experienced in reaching the colon and opening it without wounding the peritoneum, although the gut was not in the distended condition usually found when total obstruction exists. In 3 of the cases a long tube was passed through the diseased portion of the gut before the operation, and some linseed tea injected, so as to distend the gut to some extent and make it more recognisable. None of these patients died from the direct effects of the operation, but succumbed to the original disease at periods varying from 5 weeks to 9 months after the colon was opened.

Mr. Curling adds to his short paper a table which shows the result of all the cases (including the above 4) on which he up to that time had operated or assisted others to operate. These are 10 in number, 8 belonging to himself, and 2 to his colleagues. In 6 the operation was performed on account of obstruction, varying from 30 to 9 days; 3 proved fatal, in whom the obstruction had lasted 30, 17, and 10 days. In 4, as stated above, no complete obstruction existed, and all recovered from the operation. The disease was cancerous in all the cases. In the 3 cases which died death was caused in 1 by persistent vomiting, referred to the chloroform; in a second by peritonitis, thought to have existed before the operation, as only 16 hours had elapsed before death; and in the third from exhaustion, consequent, really, as Mr. Curling believes, on the disease, and not on the operation. From this ample experience Mr. Curling argues strongly in favour of the operation, as being both easy and successful.

“Amussat’s operation.”—In the ‘New York Med. Journ.,’ April, 1865, p. 55, is the account of an operation by Dr. Sands, of New York, on the descending colon for the relief of chronic stricture of the rectum, the effect (as was thought during life) of dysentery. The patient, a youth, æt. 18, had contracted dysentery while serving in the army, and cicatrization had advanced to such an extent that the rectum was almost impervious from fibrous thickening and induration of its anterior wall at the level of the pubic symphysis. No instrument could be passed, nor any injection forced up the rectum, and the patient was enduring so much suffering from distension of the bowels above that

he was ready to submit to anything which would mitigate his distress. Amussat's operation was performed with great ease, on account of the patient's emaciation and the distension of the gut. The report was written about a month after the operation. At this date the patient was in good health, with increased appetite, and had had some small evacuations from the natural outlet, holding out some hope of the ultimate restoration of the calibre of the gut.

In the December number of the same journal, however, p. 192, the sequel of the case is related. The symptoms gradually recurred, and he fell back into much the same state as before the operation, with gradually increasing abdominal distension, obstinate constipation, loss of appetite, emaciation, and paroxysms of intense pain. After death the obstruction was seen to be due to tuberculous deposit, both on the peritoneum and in the substance of the intestine, which had produced the narrowing of the rectum, and had similarly encroached on a portion, 7 feet in length, of the small intestine, which was so narrowed that its calibre admitted only of the passage of a full-sized bougie.

In the 'Med.-Chir. Trans.,' xlix, p. 65, Mr. Holmes relates a case of colotomy performed in the left loin for the relief of the sufferings produced by an intestino-vesical fistula, with success. The patient had been suffering for about 4 years from some obstruction of the bowels, and latterly had passed fæces per urethram and water by the anus. At the time of the operation all the fæces passed into the bladder, obstructing and nearly preventing micturition, causing intolerable distress, and threatening speedy death. The operation was perfectly successful in relieving him from these symptoms, the fæces passing afterwards entirely through the artificial anus, except on rare occasions, when a little fecal matter seemed accidentally to get past the opening. This was, however, too small in quantity to distress him. The urine still continued to pass through the rectum, showing that the communication was not closed. He remained in tolerable health up to the date of the report, 15 months after the operation.*

The object of this paper is to show by reference to other cases that such communications are occasionally formed between the bladder and intestinal tract, independent of previous stricture of the gut, and still more of malignant disease. That in those cases in which the fæces come from the large intestine great suffering is produced, and the formation of calculus in the bladder becomes exceedingly probable; and that in such of these cases as are not dependent on malignant disease colotomy, by diverting the fæces from the fistulous channel, may enable the latter to close, and thus relieve the patient's sufferings, and restore him to a condition of health and comparative comfort. The author also dwells upon the question of the expediency and advantage of performing colotomy in certain non-malignant affections of the intestine; and with respect to the question of the diagnosis of the seat of lesion in intestino-vesical fistula, he tries to establish indications for its dis-

* This patient is since dead, and the post-mortem appearances will be communicated to the Royal Med. and Chir. Society. It is sufficient to say here that they confirmed the views expressed in the paper.

covery in the nature of the fæces discharged from the bladder, and in the appearance of urine per anum. When the communication is with the small intestine the fæces have not, as it seems, sufficient solidity to produce much dysuria; when the opening is situated at any considerable distance from the anus it does not seem probable that the urinous discharge will be perceptible. From these two considerations, joined to the fact that the rectum appeared healthy, the seat of the fistula in the present case was diagnosed to be in the sigmoid flexure of the colon.

In connection with this case reference may also be made to the description of a case of vesico-intestinal fistula by Mr. J. Morgan ('*Med.-Chir. Trans.*,' xlviii, p. 39).

In the '*Med. Tim. and Gaz.*,' i, 1865, p. 279, are notes of a clinical lecture by Mr. Paget on syphilitic disease of the rectum and colon. The patient was a woman, æt. 28, who, after labouring under various syphilitic symptoms for about seven years, and especially ulcers and cutaneous growths around the anus, with obstinate stricture of the rectum, finally died in St. Bartholomew's Hospital of phthisis. Mr. Paget directed attention mainly to the characters of the syphilitic affection which was found in the intestines, and of the external appearances of which a living specimen was then in the hospital. Of the growths external to the anus, Mr. Paget said, "They are growths of skin grouped around the anus; in texture pinkish, soft, fleshy, glistening, moist, thinly secreting; in shape irregular, flattened as if by mutual pressure or pressure between the nates, sharp-edged, or conical. If they must be compared with something, they may be with cocks-combs, which, indeed, they are very like." Without absolutely asserting that these growths are always syphilitic, Mr. Paget said that they are very common in syphilis, and so rare without it that as yet he had not seen a case. With regard to the ulceration in the rectum, it is thus described:—"Its whole mucous membrane is destroyed, except one small patch, which is thickened and opaque. The exposed sub-mucous surface has a lowly-tuberculated, undulating, uneven appearance, and is thickened by infiltration. In the early stages the tissue is soft, as if from recent inflammatory effusion or œdema; but as the infiltration organizes it hardens, becoming callous, with fusion of the mucous and submucous coats, and then contracts, and thus brings about the stricture. The affection commonly extends from the anus, as if by continuity with the excrescence, to about five inches up the rectum; but it is rarely so marked in the first inch of the rectum as it is higher up." Of this condition, as of the anal growths, Mr. Paget does not assert that it is absolutely characteristic of syphilis. It is repeatedly seen in syphilitic women, but possibly other forms of long-continued ulceration of the rectum may be indistinguishable from it. But in the case spoken of there were ulcers in the colon, which Mr. Paget regards as altogether peculiar to syphilis, and which in the present instance must be carefully distinguished from the tubercular ulcer of the intestines, in consequence of the patient having died of tubercular phthisis; not that there is any marked resemblance between

the two forms of ulceration. We give Mr. Paget's description of the syphilitic ulcers, and of their diagnostic marks:—"On the mucous membrane of all parts of the colon there are ulcers of regular, round or oval shape, from one sixth to about two thirds of an inch in diameter, with clean, sharp-cut, scarcely thickened edges, surrounded by healthy or only too vascular mucous membrane. Their bases are for the most part level, flat, or with low granulations resting on submucous tissue, nowhere penetrating to the muscular coat, with no marked subjacent thickening or hardening. On some of them are ramifying blood-vessels; on some few there is, at the centre of the base, a small island of mucous membrane, giving to the ulcer an evident likeness to the annular syphilitic ulcers of the skin." In a few places they had coalesced, so that the round shape was less distinct; in the colon they were continuous with those in the rectum, which Mr. Paget conjectures to have had originally the same circular shape, though now destroyed by the scarring, &c. There were none in the cæcum; in the ileum only one, and that doubtful. The diagnostic marks are thus stated:—"These ulcers are limited to the large intestine, and decrease in size and number from the rectum upwards—conditions which I think are never observed in tuberculous disease. There is not a trace of tubercle, *i. e.* of circumscribed crude or softening tuberculous deposit, in the sub-mucous or any other tissue of the intestine, none in a Peyer's patch, or at the base or edge of any ulcer, or in the subperitoneal tissue below an ulcer. The shape and other characters of the ulcers are quite unlike those of intestinal tuberculosis; they are regular, with sharp, even, well-defined edges, with level bases; they are not excavating, they do not extend through the submucous tissue; their edges are nowhere eroded or undermined, sinuous, thickened, or brawny or infiltrated; the subjacent and intervening structures appear healthy, except at the rectum. These ulcers are not grouped, and where by extension or coalescence they have lost their first shapes they have acquired one altogether irregular, and have in no instances even tended towards that girdle-like shape, encircling the canal of the intestine, which is so characteristic in the large coalesced tuberculous ulcers. Thus, by negative as well as positive characters, these ulcers are clearly distinguished from the tuberculous, and, as I have said, there is no other form of intestinal ulcer to which they bear even a remote resemblance."

"On the Causes of Death after Hernia Operations."—In the 'London Hospital Reports,' ii, Mr. Hutchinson relates the details of some fatal cases of operation for strangulated hernia, in order to show that peritonitis is the common cause of death after the operation; that it sometimes occurs even after successful taxis, and proves fatal; while, on the other hand, he argues that it very rarely (if ever) occurs before either the operation is performed or taxis effected. Hence he concludes that there are two main causes for the inflammation—(1) the direct effect of the wound of the peritoneum (and Mr. Hutchinson is not inclined to rate the mere danger of the operation so low as some authors do); and (2), which he regards as the graver danger, the reduction into the peritoneal cavity of gut previously inflamed, and there-

fore in a condition to spread the inflammation, in a patient predisposed to the unhealthy diffused form of inflammation, to the rest of the serous cavity. Hence he concludes—(1) that time is of extreme value, and therefore that, in a case of strangulated hernia, the surgeon should never rest till he has got the gut reduced, without an operation, if possible; if not, by operation. (2) That in every case of long strangulation the sac should be opened in order to inspect the bowel. (3) That if the bowel is found in a damaged condition, *i. e.* inflamed and mottled in colour, although not absolutely gangrenous, it is better to divide the stricture freely and leave the gut in the sac. (4) That preventive treatment should be adopted for peritonitis, by anticipation, if inflamed bowel have been returned. Mr. Hutchinson appears to trust for this purpose chiefly to the action of mercury.

Zeis relates, in 'Langenbeck's Archives' for 1865, pp. 136 and 199, some rare occurrences in operations for hernia. In the first place, he remarks that occasionally the hernia may be devoid of a sac, in consequence of the rupture of the latter. He gives a series of references to authors who have treated of the causes of absence of the hernial sac; and he remarks on the occasional difficulty, even to experienced surgeons, of distinguishing between the surface of the gut and the hernial sac. He then gives full details of two cases in which he had the misfortune to open the gut; in one instance after a very careful examination made with a view to settle this very point, in the other without any suspicion. Post-mortem examination in both instances led to the conclusion that the hernial sac had been ruptured at some former period, and terminated near the hernial opening. This had probably occurred as a consequence of attempts at reduction, and the subsequent exposure of the serous surface of the gut to the contact of the membranes in the neighbourhood, unprotected by the hernial fluid and the smooth surface of the peritoneum, had altered its appearance.

He discusses at length the causes which may lead to such a mistake of the gut for the sac, but does not appear to be able to point out any infallible means of making the distinction in some rare cases.

He then relates a case in which in a femoral hernia a double sac appeared to be present. The sac having been opened, and a little hernial fluid evacuated, a round swelling came into view, with a membranous envelope, but no distinct appearance of bowel. The surgeons present were doubtful whether this was the outer surface of the gut or no, and it was a matter of great doubt what course to take, when an accidental rent made in the membranous envelope showed the bowel below it. The operation ended fatally, but an autopsy could not be procured. He explains the double sac by the existence of plastic exudation at some former period in the peritoneal sac, which had become organized, though he allows the possibility of a hernia of the peritoneum into a previously existing sac, and refers to authors in support of both views.

Dr. Rose, of Kidderminster, in relating a case of strangulated femoral hernia in which, after taxis had failed under chloroform, the intestine returned of its own accord some hours afterwards, when an operation appeared inevitable, makes the following observations:

"This reminds me of Mr. Jordan's extra-peritoneal and pretaxoid operation for strangulated hernia, which is well worthy of the attention of the profession. He says, 'In cases of strangulated hernia it is quite unnecessary even to expose the sac. All that is necessary in practice is to relieve the tension of Gimbernat's ligament in femoral hernia, of the conjoined tendon or fibrous aperture in inguinal hernia, and of the linea alba in umbilical and the more common forms of ventral hernia.'"

('Lancet,' 1865, i, p. 507.)

"Strangulated Congenital Inguinal Hernia in the Female."—The patient was a child 3 years old. Immediately after her birth it was discovered that she had inguinal hernia on the right side, and by the advice of the attending physician her parents procured a truss, which was applied, and appeared to answer the required purpose. On January 3 Dr. J. H. Armsby was called upon to visit the child. On examination the hernia was found presenting directly over the pubic extremity of Poupart's ligament. Attempts had been made to reduce it, but without success, and anodynes and warm fomentations had been ordered. It was now 72 hours since the first symptoms of strangulation had appeared, and the child was greatly debilitated by the pain and constant vomiting, was perspiring profusely, her expression was pale and cadaverous, and her pulse was 160. The operation was immediately performed in the way ordinarily practised for strangulated hernia in the adult. The parts were greatly swollen and congested, and about 3 inches of the ileum, not far from the *caput coli*, were found protruding, completely strangulated and gangrenous. The portion of intestine involved adhered firmly to the sac and surrounding soft parts, and was soft and partially disorganized. Dr. Armsby left the gangrenous portion of intestine as he found it, and applied a linseed-meal poultice. Before the next morning it separated, and faecal matter escaped freely at the opening. The patient improved rapidly under the use of anodynes and tonics; the wound gradually contracted until the twelfth day after the operation, when she had a natural evacuation from the bowels, and no more faecal discharge from the opening. The wound healed kindly, and one month after the operation cicatrization was perfect, and the patient restored to her usual health. ('New York Med. Record,' April 16.)

"A simple method of Radically Curing Reducible Hernia." By Julian J. Chisholm, M.D., Professor of Surgery in the Medical College of S. Carolina, U.S. from the 'Lancet,' ii, 1866, p. 231.—The object of this operation is to sew the columns of the inguinal ring together, subcutaneously, by silver wire, leaving the wire permanently in the tissues. The only instrument necessary is a stiff needle 5 inches in length, very slightly curved at the point where the eye is, and mounted in a handle. The bowels are to be cleared out, the hair shaved off, the hernia reduced, and then the left index finger is to be placed over the centre of the fundus of the scrotum, palmar surface upwards, with the needle lying upon it, the eye corresponding with the pulp of the finger, which thus can guide it in any required direction. The finger with the needle, now capped with scrotal tissue, is then passed up the inguinal canal

until the inner face of the columns can be readily felt. The pulp of the finger having been passed well behind the internal column, the handle of the needle is seized, and the point, directed by the finger, is made to transfix the conjoined tendon and internal column at some distance from its free border. When the point of the skin projects under the skin of the abdomen an assistant draws the skin inwards, towards the median line, so as to make the needle perforate that portion of the skin which would normally lie over the centre of the canal. The needle is now threaded with silver wire, and drawn back through the scrotum, leaving one end of the wire projecting from the abdomen. If the point of the needle has escaped from the scrotal puncture it is reinserted into the same puncture, and passed in a similar manner through the external pillar of the ring, and made to emerge at the same puncture on the abdomen as before. The wire is now detached and the needle withdrawn, leaving the two ends of the wire protruding from the abdominal puncture. Now the ends of the wire are to be firmly drawn upon, while the scrotum is held down and prevented from becoming invaginated, by which means the loop of wire is made to dissect up or tear the scrotal fascia to the immediate neighbourhood of the ring. If the finger be now passed into the canal it can be felt to be squeezed as the wire is drawn upon, and if the finger be taken out of the canal and the wire still drawn upon the ring will be so narrow that the finger cannot be reintroduced. The wire is now twisted from above with a torsion forceps, and when the columns are brought well into apposition, without so much traction being made as to cause the wire to act as an *écraseur*, the ends of the wire are cut off as close as possible to the abdomen, when that portion left in the wound immediately disappears under the skin. The punctures heal in a few hours. The patient is to be kept quiet for some days till the wire is imbedded in lymphic effusion. No truss need afterwards be worn. It would, in fact, be injurious, by compressing the parts painfully against the imbedded wire. Should the orifice of protrusion be large, as in old inguinal and umbilical herniæ, two or more sutures may be required. Great care should be taken to make the needle re-enter the scrotum at exactly the same point, otherwise the resulting bridge of skin under the wire will oppose the passage of the wire into the tissues of the scrotum, and cause the scrotum to become invaginated.

The subsequent extracts refer to urinary diseases, in relation to which, however, the most important part of what we have to offer has already been given under the head of "Endoscopy."

"Gunshot Wound of the Bladder."—In the 'New York Medical Journal,' May, 1865, p. 102, Prof. van Buren relates the case of a man who was shot, in a riot in that city, with an ounce musket-ball, through the bladder. The course of the ball was apparently from left to right directly across the pelvis, and from before backwards on a level with the anterior superior spines of the ilium. The wound was received at 5 p.m. He had dined at 3½ p.m., and had not emptied his bladder since 9 a.m. When struck, his first motion was to put his hand to the wound, and he found himself then drenched with urine. When seen,

half an hour afterwards, the finger passed readily through the wound (which was $1\frac{1}{4}$ inch to the left of the median line, and 2 inches above the brim of the pelvis) into a cavity behind the abdominal walls, where nothing could be felt except coagulated blood. On percussion no evidence of distended bladder could be found, nor was there any collection of fluid, nor was anything abnormal felt from the rectum. The bullet was lying on the back of the right buttock, about 1 inch above the summit of the ischiatic notch, and was afterwards removed by a simple incision; no urine escaped from this wound. There was at no time any symptom of peritonitis. The catheter was never used. He was kept for 8 days under the influence of morphia, and, after this, morphia was administered occasionally. The urine passed from the wound for 15 days, except on one occasion, on the 8th day, when some passed per urethram, but with much pain. On the 22nd day the wound was entirely healed. Prof. van Buren attributes the escape of this patient, both from peritonitis and from cellular infiltration, to the extensive distension of the bladder at the time pushing up the peritoneum, and causing a very direct and large wound into the bladder. It was this feature of the case which led him to abstain from the use of the catheter. Mr. van Buren remarks, "The continuous presence of a catheter in the urethra and bladder of a man already suffering from a most serious wound is no trifling addition to the burthen he has to bear; and although, in deference to all high authorities, from Chopart and the Larreys to Legouest and Hamilton, the use of the instrument is properly regarded as the rule in gunshot wounds of the bladder, the result of this case demonstrates that the rule may be occasionally disregarded to the advantage of the patient."

"Hydatid Cyst in the Pelvis, causing retention of urine and constipation; successful removal of 3 quarts of Hydatids; death on the 9th day." Mr. Bryant, in 'Path. Soc. Trans.,' xvii, 278.—Mr. Bryant was called into the country to see a man æt. 50, of steady habits and good constitution, who had suffered from retention of urine for 4 days. He had never experienced any illness, except that on two previous occasions he had suffered from retention of urine. On both these occasions (one in 1851, the other in 1858,) no surgeon had been able to pass a catheter, although several had tried, but the bladder had suddenly resumed its functions. After the subsidence of the second attack he was examined for stricture, and found quite free from it, the catheter entering the bladder regularly. When Mr. Bryant saw him (Nov. 5, 1865) he had passed only a few drops of urine for 5 days, and the bowels had been confined for a longer period, but he was not suffering much pain; the skin was moist and cool, pulse and tongue normal. Many attempts at catheterism had been previously made. Mr. Bryant also failed in passing the catheter. A large cystic tumour was made out in the abdomen, extending from the pelvis to the scrobiculus cordis, smooth in outline and clearly fluctuating, but projecting oddly forward on the right side, and passing up higher on the left side of the abdomen than on the right, and thus differing in appearance from a distended bladder. It was decided to puncture the bladder from the rectum, and this opera-

tion was undertaken on the following day. During the night the patient's condition became worse, vomiting having set in with some severity, but it seemed probable that this depended on the quantity of purgatives which he had taken. Two punctures were made from the rectum, in order to reach the bladder, supposing it to have been displaced backwards. Some clear fluid and fine membrane was drawn off by the punctures. Mr. Bryant now determined to cut down on the tumour from the perinæum. He first laid open the urethra from the middle line, guided by a catheter, then punctured the tense tumour which could be felt by the finger deep in the pelvis; this having been recognised as hydatid, a free incision was made into it with a bistoury, and as much as 3 quarts of hydatids removed with the finger, spoon, and forceps. The cavity occupied by the cyst was then well washed out. Finally, an attempt having been made in vain to reach the bladder with a catheter, it was punctured from the perineal wound, where it was distinctly to be felt, and a quart of dark coloured urine was drawn off. The immediate relief to the patient was great, but he died on the 9th day after the operation, the constipation having never been relieved. After death the kidneys were found to be granular. There was no peritonitis or any other disease, but the colon was much distended with indurated fecal matter. The bladder was found in the left iliac fossa, completely raised out of the pelvis by a large cyst developed between it and the rectum. This was considerably contracted, but still contained a few hydatids.

M. Perrin has communicated to the Soc. de Chir. a paper published in the '*Gaz. des Hôp.*' June 3, 1865, giving the final account of 13 cases of internal urethrotomy, the notes of which he had first published two years before. The object of the paper is to show the durable results of the operation in most cases. M. Perrin is not in the habit of using subsequent dilatation after the operation. Of the 13 cases (all of which were done in military practice), 4 had passed out of sight. Of the remaining 9, 1, who had had numerous urinary fistulæ, of old date, and complicated with considerable plastic infiltration, had a relapse immediately; a second had a relapse at the end of a year; but the other 7 had preserved all the benefits of the incision up to the time of the report (on an average 3 years) or else up to the time of their death.

In two subsequent communications, June 6, 10, M. Perrin explains and justifies his method of operating, and compares its results with that of other proceedings. He never uses any sort of consecutive treatment. In the same paper for June 13 M. Perrin deduces from his experience the following conclusions:—1. That internal urethrotomy is more prompt in execution, as certain, more convenient for the patient and the surgeon, than progressive dilatation. 2. That with the recent improvements it is not more dangerous than dilatation. 3. That its results, both immediate and remote, are at least as satisfactory as those of any other method, and therefore that it ought to be preferred as a general treatment for such strictures as interfere with the complete evacuation of the urine. For other cases the ordinary methods will serve. M. Perrin argues strongly in favour of the antero-posterior

method of urethrotomy. He believes no subsequent treatment is necessary, but is not absolutely opposed to the plan of tying in a catheter for about 36 hours.

In the same journal for June 17 is the report of a discussion on the same subject, introduced by M. Follin, founded on 12 operations of his own. He dwells on the importance of detecting kidney disease, which forms a contra-indication. Otherwise, urethrotomy should be performed in all cases of rebellious stricture.

The discussion on this subject is continued in the same journal July 1, 6, 8, 22, 25, 29.

"On the Crushing of Large Stones in the Bladder during Lithotomy." By M. Cíviale ('Gaz. des Hôp.,' Dec. 12, 1865, p. 577).—M. Cíviale gives a description of some instruments which he has invented for the above purpose (and which were shown by Mr. Henry Thompson to the Royal Medical and Chirurgical Society). The author begins by alluding to various fatal operations which he has performed on men for extracting calculi of enormous size from the bladder, and to some unsuccessful ideas which had occurred to himself for instruments to crush the stone in these cases. Hitherto they had been constructed as independent instruments, which were to break the stone, after which the forceps were to be introduced to extract the pieces. His present proposal is so to modify the forceps as to adapt it to the purpose of breaking the stone. The forceps should be of large size, and made to take to pieces, after the fashion of midwifery forceps. When the stone is seized firmly between the blades of the forceps the latter are fixed immovably upon each other by means of a double catch or handle, which slides down upon the two blades, and is fixed by means of a screw. Thus the apparatus is rendered immovable, and in the central stem of the catch or claw a drill is worked by means of a screw-head, or, if more power is required, of a bow. When the stone is pierced it can be turned round, after relaxing the hold of the forceps, by means of the drill. After one or two holes are bored into the stone the forceps will crush it. For minor details, and the drawings of the instruments, the reader must consult the original.

M. Cíviale says that he has operated in this way upon 18 patients, all of whom (except 1 child and 1 adult) had calculi too large to be extracted from the perineal wound without great difficulty. Four only died. The wound healed in all the cases which did well, though in 3 the urine passed through it for more than a month.

Prolapsus of the Urethra in Children.—M. Guersant says that prolapse of the urethra, although scarcely if at all described in surgical works, is not a very rare affection in female children. During 20 years of practice he has seen it in at least 12 or 15 patients, aged from 2 to 12 years. The causes of the prolapsus have appeared to him to be, the paroxysms of whooping-cough, or the frequent cough of bronchitis, or constipation demanding violent and frequent efforts at defæcation; and also general debility, as during prolonged convalescence from acute diseases, and often in the course of chronic diseases. The patients make but little complaint. Sometimes, however, the desire to pass urine is

frequent, and some scalding is felt during the flow. When the labia are separated the vulva is generally seen to be of higher colour than is normal. At the urinary meatus there is a small rose-coloured mucous tumour; it appears to proceed from the interior of the canal, and has in its centre an opening, into which a catheter can be introduced, on doing which its nature is at once recognised. The tumour may remain stationary a long time; but sometimes it enlarges slowly, and discharges a sanguineous exudation, afterwards a purulent serosity. It increases in size, and sloughs superficially; the neighbouring parts become inflamed, and vulvitis is produced. The exudation may increase without causing much pain; but the child has heat and smarting in passing urine. M. Guersant has not seen any of these tumours, which had been left to their own course for a very long time; but he believes that, at length, they would sphacelate in whole or in part, and give rise to a sero-purulent discharge. The tumour may be confounded with urethral polypus; but, on attentive examination, it will be found that the polypus presents itself in the form of a more or less pedunculated tumour, the pedicle of which reaches within the canal, while the prolapsus has the form of a very small swelling surrounding the meatus urinarius—resembling, on a small scale, prolapsus of the rectum. The only method of giving prompt relief is excision. It is not necessary to use an anæsthetic, unless the child be timid and difficult to manage. The patient is placed at the edge of a bed; the thighs are held apart, and the labia are separated so that the surgeon can plainly see the tumour, and draw it down gently by means of a loop of thread. It is then cut off by means of curved scissors. There is little hæmorrhage, and it is easily arrested by the application of cold water; if not, an aqueous solution of perchloride of iron may be applied for a few moments. Cold-water dressing, and a few applications of solid nitrate of silver, are sufficient to produce cicatrization. The patients have for a few days some pain in passing urine; but this subsides. In one case the hæmorrhage could not be arrested by perchloride of iron; but M. Guersant succeeded by applying ice for 24 hours over the hypogastrium and to the vulva. ('Bull. Génér. de Thérap.,' October 15, 1866.)

Affections of the male genital organs must now be noticed, those of the female being included in the Report on Midwifery.

Syphilisation.—This subject has attracted a good deal of notice in England recently, in consequence of the experiments carried on upon the female patients of the Lock Hospital by Prof. Boeck, of Christiania, in conjunction with Messrs. Lane and Gascoven, surgeons to the hospital. An account of these cases, and of the treatment as far as it had then gone, will be found in the 'Lancet' for Jan. 13, 1866, p. 37, together with the report of a discussion which took place at the Medical Society of London. Mr. H. Lee has commented in the following terms on the method, in a lecture reported in the 'Lancet,' April 7, 1866. We should mention, however, that Prof. Boeck protests against Mr. Lee's conclusions as premature, and impugns some of his statements and reasoning, in a letter to be found in the same vol. (p. 718) of the 'Lancet.'

"The *modus operandi* is well known, and is very simple. The inoculations are performed first on the sides of the thorax, then on the arms, lastly on the thighs. Six punctures are made every 3 days in symmetrical positions, the matter for each inoculation being always taken from its predecessor, as long as it takes effect, a fresh supply being used only when the former has entirely lost its force. The pustules from which the matter is taken *form in about 3 days*. More frequent or more numerous punctures are not desirable, because, if the process be carried on with too much rapidity, *immunity is attained before the syphilitic symptoms are cured*. The matter used is said to be taken from an indurated chancre by preference. The mean time required to complete the cure is said to be *four months, six months*, or even longer.

"The practice became very common in the North of Europe, and the year 1865 has witnessed its practice in this country, under the immediate *surveillance* of Dr. Boeck himself.

"Let us examine the more salient features of this method in detail.

"1. Are the phenomena observed in syphilisation so peculiar and new that they cannot be referred to the operation of any natural law—such, for instance, as that the skin, nay, the body itself, may possess a power of resistance against irritants and poisons, so that these require to be increased in force or amount to sustain their primary effect, until such a condition of insusceptibility to their action is produced that they finally cease to have any effect at all?

"2. What is the *modus operandi* of the action of syphilisation? Does it exert a specific, that is, an action not only different in degree, but distinct in *kind*, from that derivative and depurative one which all processes of continuous suppuration more or less possess?

"3. In what sense is it curative? Is it by preventing or removing the *manifestations* of syphilis, or is it by *eradicating the virus* on the presence of which the disease depends?"

After referring to experiments by Cullerier and W. Hammond, to show that blisters gradually lose their effect, and to some by Dr. Lindwurm on repeated applications of tartar-emetic ointment in syphilis (quoted in the 'Year-Book' for 1860, p. 325), and to the fact that croton oil loses its irritating properties after repeated application, Mr. Lee goes on to say—"But the action and curative influence of a blood depuration through the skin by means of irritant applications was never, perhaps, tried so zealously upon a large scale as by Dr. Rennie, the late surgeon of Her Majesty's 31st Regiment, whilst in China. . . . Besides fevers, many other diseases exhibited, according to him, symptoms 'depending on the presence in the blood of the elements of purulent matter, which, if left to pursue their course, might terminate in some fatal suppurative action or purulent collection internally, but which could be arrested in their growth, and the matter in course of formation within the current of the circulation extracted from the blood, and conducted to an innocuous termination.' With this view he was led to use frictions with tartar emetic and croton oil. . . . Among other cases, syphilis was so treated, with the effect, as Dr. Rennie conceived, of preventing the secondary eruption. . . . Now, *it was a curious fact—a fact to which the medical officer used to point in corroboration of*

his views as to the exhaustion of the morbid matter through the skin—that these remedies completely lost their effect in time. The integuments refused to respond to the irritants, and, what is more, after a course of frictions with tartar emetic the immunity was not merely local but general, for healthy portions of skin were proof against the action of the ointment.

“There is a close analogy between the action of this method and that of continuous inoculation.

“It must be remembered that the effects which follow the repeated application of external irritants are very inferior to those obtained from the inoculation of the virus of the soft sore. The first are simple pustules or ulcers, constantly tending to heal; the latter are specific ulcers, pursuing a longer and more active course, difficult of eradication, and produced by an agent of superior and more subtle powers. Whatever be the curative powers possessed by the first would reside much more strongly in the last; the immunity would not be nearly so speedily obtained, but on that account would be much more durable. Although Dr. Boeck maintains the immunity to be complete and permanent after the virus from several fresh sources has been used and failed, and that matter from any source has no more effect than so much water, this is rather asserted than proved. Until those who have undergone syphilisation have been made the subjects of experiment at various intervals of time, such permanency has yet to be demonstrated. Until this has been done, it seems more consonant with pathological laws to suppose Prof. Faye’s explanation of the facts to be the true one, viz., that the result is a temporary immunity, be it short or long, of the over-stimulated skin, and that the cure of syphilis is due to the depuratory action of the skin, excited by successive inoculation.

“It may also be quoted, as a fact worthy the serious consideration of the profession, that the immunity itself is a thing not so easily produced. During the four months that Prof. Boeck remained in this country he has produced, as was supposed, immunity in two patients only. Mr. James Lane was good enough, after the immunity was supposed to be established, to allow me to perform a fresh inoculation upon each patient. A specific pustule was in each case produced, and from one of these Mr. Lane himself inoculated.”

As to the *modus operandi* of syphilisation, Mr. Lee calls attention to the great lapse of time which the treatment demands as in itself an important source of possible fallacy, since the disease tends in many cases to a spontaneous cure, for statistics of which he refers to M. Diday’s ‘*Histoire Naturelle de la Syphilis*.’ The progress of the disease to spontaneous cure may also, he thinks, be the explanation underlying the statement (if true) that it is necessary not to make the inoculations too numerous or too frequent, lest immunity be reached before the cure of the patient be established.

As to the eradication of the virus from the system, Mr. Lee calls attention to the fact that some of the patients treated by syphilisation have exhibited tertiary symptoms; and considering the very long interval of time at which these symptoms may appear, others may yet occur. The best test (though imperfect) of the eradication of the virus

appears to be the procreation of healthy children; and it still remains to be seen whether any remedy is as efficacious as mercury, when tested in this way.

Another point is the influence which external suppurations, ulcerations, &c., exert upon the course and character of the syphilitic manifestations. On this head Mr. Lee remarks that there seems ground for believing that open ulcerations—phagedenic or serpiginous—sometimes, at any rate, check the general manifestations of the disease, so that the lesions of internal organs may be suspended or prevented by the prolonged ulceration caused by the syphilising process, “by diverting the *materies morbi* to the external covering of the body, and by depurating the system through this part. We cannot, however, speak as yet of this with any certainty, because we lack the necessary number of observations as to the pathological state of the internal organs of persons treated by syphilisation.”

In a subsequent lecture (‘Lancet,’ April 14, 1866) Mr. Lee goes carefully into the comparative results of the treatment of syphilis by syphilisation and by mercury administered in the form of calomel fumigation. Mr. Lee refers to the great difficulty of inoculating the virus of a hard or infecting chancre, referring to his own experience, and to the experiments of Ricordi, published in the ‘*Annali Universali di Medicina*,’ Jan. 1866. He says that the only case in which he believes that inoculation from a hard chancre has succeeded on the patient himself was one which was under the care of Mr. Walter Coulson at the date of publication. Mr. Lee also dwells upon the difference which exists (and which Dr. Boeck denies) between the infecting and the soft or non-infecting chancre. In proof of the reality of this difference, he quotes the following evidence derived from Dr. Marston’s observations in army hospitals:—102 cases were diagnosed at the time of the first occurrence of the disease as “soft sores.” One only was followed by secondary symptoms, 21 were classed as doubtful, secondary symptoms followed in 10 cases, 64 were marked as “infecting,” and secondary symptoms occurred in 57. Dr. Boeck’s denial of this distinction invalidates the statistics in his table in Mr. Lee’s eyes.

“During Prof. Boeck’s stay in England he treated, as he informed me, 19 patients affected with constitutional syphilis in the female Lock Hospital by repeated inoculation. Of these 19 two only were supposed to have obtained an immunity from syphilitic inoculation when Dr. Boeck left, and these two (as above mentioned) I successfully inoculated in Dr. Boeck’s presence. Fourteen of these 19 still remained in the hospital, I believe, on Feb. 23, two months after Dr. Boeck had left. These women submitted to the treatment under the idea that they would not in future be liable either to receive or to communicate disease.” Very few other patients have been treated by syphilisation. Mr. Lee mentions that, of these, 2 have died, but whether from any effect of the treatment he does not say. He mentions also that he has seen a few male patients who have been syphilised in private practice; but in all these cases, which he has himself seen, he was doubtful whether the disease was truly syphilitic.

He says “that Prof. Boeck had not some better results to show after

4 months' residence in England was not, perhaps, attributable to him. He expected that 65 patients would have been placed at his disposal, under the sanction of Government, from the time of his arrival; but, as it happened, he had an opportunity of treating such cases only as were supplied to him from private sources. It would be manifestly unjust to judge Dr. Boeck's system by the results thus furnished. . . . We have, on the other hand, extensive and most accurately kept tables in Prof. Boeck's great work, which furnish abundant proof that the symptoms of constitutional syphilis will disappear under the continued irritation kept up by repeated inoculations." Mr. Lee then proceeds to show that the advantages claimed for the method, viz., that it prevents the internal organs and the bones from becoming affected, and that relapses are rare after it, are not yet proved, though he allows it to be probable that the derivative effect of the irritation of the skin may obviate the tendency to implication of internal organs—an effect which he also attributes to the method of treatment by calomel fumigation. With respect to the time occupied in treatment, he compares Prof. Boeck's statistics of syphilisation, which give an average of rather more than 19 weeks as the time occupied in treatment, with those of the calomel vapour bath, as used by himself at the Lock Hospital, which give for 213 cases an average of exactly 6 weeks. Mr. Lee also dwells upon other advantages of this method of administering mercury. He concludes in the following terms:—"Jenner warned the profession in his day against the belief that every successful inoculation with matter taken from a vaccine vesicle was necessarily the real vaccine disease; and he especially notices that after a vesicle had suppurated it was very liable, upon reinoculation, to produce an affection which was not followed by the legitimate results of the vaccine disease upon the patient's constitution. To apply the warning which Jenner gave to our present subject may not be out of place. It no more follows that the successful inoculation of matter from the surface of an indurated sore produces real syphilis, than it follows that the production of a pustule by inoculation from what was once a vaccine vesicle necessarily communicates genuine vaccine disease. We conclude,—

"1st. That no evidence has hitherto been adduced satisfactory to the profession that the infecting form of syphilis can be inoculated upon a patient who is at the time the subject of constitutional syphilis.

"2nd. That both from a soft sore, and also occasionally from the surface of an indurated sore, matter may be taken which may be made to produce a number of local specific ulcerations having the characters of the soft chancre.

"3rd. That during the continued irritation of such ulcerations the manifestations of secondary syphilis will disappear.

"4th. That the time required for the treatment of syphilis in this way is so long, and the inconveniences attending it are so great, that it is not in any degree likely to be adopted in private practice in England."

It appears from the most recent and very elaborate work of Lance-reaux ('*Traité Historique et Pratique de la Syphilis*,' Paris, 1866, p. 749), that the judgment formed of syphilisation in Paris is much the

same as that of Mr. Lee. Lancereaux says, "The therapeutical efficacy of syphilisation is not yet sufficiently proved; and if we allow that this mode of treatment is useful, it is only in some given cases, and there is no possibility of certifying its success. From this it follows that syphilisation is never to be preferred to the diverse methods of treatment above described. Besides, it is very probable that the therapeutical effects of syphilisation consist in a revulsive action, which is merely local." M. Lancereaux then proceeds to describe Cullerier's experiments on the treatment of syphilis by a number of small blisters repeatedly applied; and Hjort's, of Christiania, under Dr. Boeck's direction, by tartar-emetic plaster. He concludes that the action of syphilisation is merely analogous to that of other revulsives of equal power, and that the treatment is only applicable to special cases [and those, to judge from his reasoning, cases of skin affection mainly], which have resisted all ordinary methods of treatment, such as mercury, iodide of potassium, ferruginous preparations, and mineral waters. This is also, he says, the opinion of other eminent practitioners—Gibert, Bazin, Diday, &c.

M. Lancereaux also describes a method which has recently been introduced in Russia, but has not attracted any favour there, of treating syphilis by the repeated inoculation of the vaccine virus. In the successes claimed for this method, as for that by syphilisation, M. Lancereaux says that the tendency of the disease to spontaneous cure has been quite left out of sight.

Dr. Bidenkap, of Christiania, replies to Mr. Lee's observations, in the 'Lancet,' Aug. 4, 1866.

In Dr. Bidenkap's letter he describes minutely the way which he adopts in order to render the indurated chancre auto-inoculable. This appears to consist in irritating the sore with savine ointment until a purulent secretion is produced, and then repeating the inoculation for weeks; after which, he says, the characteristic pustule will make its appearance, with its consequence—the excavated ulcer. He repudiates Mr. Lee's and Dr. Ricordi's experiments as not having been continued sufficiently long. Dr. Bidenkap strongly reasserts the identity of the origin of the soft and indurated chancre, and he also appears to believe in syphilisation as the best method of cure. The terms in which he speaks of the immunity obtained by the process are these:—"Whether the immunity produced by syphilisation is complete or not is nothing to the point. The fact is, that it produces a state of system in which the production of inoculable matter is failing or incomplete. This is enough, both according to theory and experience. The immunity produced by cowpox, and even by smallpox, is neither absolute nor everlasting, yet no one denies its existence." He strongly denies the theory that this immunity is the mere result of cutaneous irritation. In connection with this subject the reader may also consult a paper by Dr. Faye, translated in the 'Lancet,' which, however, as being published in the present year, hardly comes within the scope of this report.

"On some Cases of long Incubation of Syphilis" ('Gaz. des Hôp.,' April 1, 1865).—A summary is given of some observations published by M. Fournier on this subject. Eighteen cases are contained in this

publication, 4 of which are rejected by the author as doubtful; in the remaining 14 the incubation lasted 17 days, 3 weeks, over 3 weeks, 25 days, 25 or 28 days, 4 weeks, 3 weeks to a month, 30 to 35 days, 33, 35, and 36 days, 33 to 40 days, and, finally, more than 2 months.

In the last of these cases, where the incubation lasted 72 days, M. Fournier (who attended the patient) was able to convince himself of the entire accuracy of the facts, and had the opportunity of examining the person from whom the infection proceeded.

A series of articles in the '*Gazette Méd. de Paris*' for 1865 gives an account of a discussion, recently held at the Académie de Médecine, on the subject of vaccino-syphilis. The matter was brought before the Academy by the proposal of a report on this affection, drawn up by M. Depaul for presentation to the Minister of Public Works. This report commences by an enumeration of the published cases, with references, which, though perhaps not quite complete, will be found useful by any person who is studying the literature of the subject (pp. 17—21). M. Depaul concludes from these cases that, although each may be wanting in some detail, and liable by itself to criticism, yet they do establish sufficiently the fact of the possibility of syphilitic inoculation by means of the vaccine virus, and intimates that this truth would have been more early recognised but for the influence of the teaching of M. Ricord—that nothing but a chancre could be the source of infection. M. Depaul notices certain objections, viz.—(1) That the cause of the syphilitic symptoms in the subjects of vaccination may have been constitutional syphilis from other causes. This is negatived by the fact, observed in all cases, that the first symptom is an indurated ulcer (chancre) on the spot vaccinated, followed, after a certain interval, by secondary symptoms, quite contrary to what is noticed in cases of preceding constitutional syphilis. (2) That the source of the infection on the "vaccinifer" has not been ascertained. This is true in many cases, although not in all, but cannot disprove the diagnosis drawn from well-known symptoms. (3) That in inoculations made with the same virus some escape with impunity. This is the case, more or less, in all inoculations of every kind, and merely shows that the vaccine virus is a less sure medium of syphilis than the secretion of a chancre. (4) That direct experiments have been made without result. Those of M. Bidart are to be found in the '*Journal de Médecine et de Chirurgie Pratiques*,' ii. In the '*Journal de Médecine de Lyon*' it is related that M. Montain asserted before the Society of Médecine that he had seen, since 1848, 30 children inoculated with vaccine liquid taken from a syphilitic subject, and nothing but the vaccine eruption followed. MM. Schreier and Taupin have also collected similar cases. But such negative facts cannot impugn the positive occurrences previously referred to. They are susceptible of different explanations, and have even been used as additional evidence of the vaccino-syphilitic theory. M. Depaul then discusses the theory of the precise source of the syphilitic infection in vaccination. Is immunity to be obtained by avoiding an admixture of blood? M. Depaul doubts this, and draws attention to the fact that the liquid used in vaccination is far greater in quantity than the vaccine

vesicle could contain, and must, therefore, have been furnished directly from the capillaries of the affected skin. It is difficult to see how the mere admixture of a few blood-globules can change the fundamental qualities of the liquid, and render it capable of producing syphilis. Still, it is proper to bear the theory in mind, and avoid any mixture of blood with the lymph. The most important precaution, however, is to vaccinate from perfectly pure sources. Now, the main source of vaccino-syphilis being congenital syphilis in infants, and this disappearing usually between birth and the age of 6 weeks, it follows that the most natural precaution is to take the vaccine lymph always from infants above the age of 2 months, and to take care that the infant has been examined from head to foot, and is clear of any eruption, in good condition, and thriving. Some practitioners believe that a needle is a safer instrument than a lancet, and that lymph preserved in tubes is better than that freshly drawn from the arm; but little reliance can be placed on these precautions. Again, M. Depaul does not give a confident opinion as to the advisability of recurring constantly to the original cow-pox, by taking fresh lymph from time to time from heifers inoculated for the purpose. This would seem to give security against the transmission of syphilis to the individuals inoculated with the fresh lymph; but it would be very troublesome in practice.

The same number of the 'Gazette' contains (pp. 31 and 599) an address of M. Ricord to the Academy in answer to this report. In his speech M. Ricord defends himself against having propagated doctrines leading to error in this matter; but the chief value of his address to our readers will lie in its containing a criticism of many of the published cases of alleged vaccino-syphilis, such as the well-known case of the children at Rivalta. M. Ricord, while by no means denying the possibility or even the occasional occurrence of syphilitic inoculation in vaccination, thinks that the event is so rare as hardly to constitute a real danger. M. Depaul's facts, and the inferences he drew from them, were severely criticised by M. Blot and M. Jules Guérin (pp. 45, 46), who, without denying the possibility of the occurrence of syphilis in vaccination, appear to think that many different eruptions have been considered syphilitic, and that it would be highly improper to shake the popular confidence in vaccination. M. Trousseau sustained the opposite opinion, and supported the adoption of M. Depaul's report, and several other members spoke on each side of the question; but the proposition of sending the report to the Minister of the Interior was ultimately negatived. The chief value of the discussion is for the references it contains to the published cases of alleged syphilitic inoculation in vaccination, and the criticism to which those cases are subjected.

"On the Mixture of Blood with the Semen" ('Gaz. des Hôp.,' May 9, 1865, p. 217).—M. Demarquay gives some cases of this affection both from his own practice and from published sources. He puts two questions:—1. What are the chief causes of the mixture of blood with the semen? and 2, Of what maladies may it be a symptom? To these he replies, that the chief causes of bloody ejaculation are—masturbation,

excessive coition, and inflammatory affections of the genital organs, so that it may be a symptom of acute or chronic orchitis, of inflammation of the seminal vesicles, of chronic urethritis, of wounds or extirpation of the testicle, and possibly of organic affections of the prostate. Of all these, except the last, M. Demarquay gives instances or references to authors.

Two other cases, of a similar nature, are published by the same journal in the '*Gaz. des Hôp.*,' Aug. 10, 1865.

"On Tumor of Testis containing 'Fœtal Remains,' with a case." By Dr. Van Buren, Professor of Anatomy, University of New York.—Dr. Van Buren relates a case in which he removed the left testicle of an infant, æt. $2\frac{1}{2}$ years, on account of a tumour, which had been thought to be a hydrocele, and treated with a seton, but with the effect of causing much suppuration, recurring at intervals, and the protrusion of a fungus about the size of a walnut, and of a very malignant appearance. After the removal (which was successful in restoring the child to perfect health) Dr. Van Buren discovered in it a cavity which contained a portion of the jawbone with several teeth. Dr. Van Buren, in commenting on this case, puts before his readers the two theories which have been emitted with regard to them, viz. either that such tumours are the result of a local plastic effort, determined by injury or inflammation, and liable to occur at any period of life; or, on the other hand, that they are the result of the inclusion within the testicle of one fœtus of a fecundated Graafian vesicle, the rudiments of another fœtus, and therefore necessarily congenital. He points out that all the 10 cases recorded by M. Verneuil in his article on the subject in the '*Arch. Gén. de Méd.*,' 1855, were proved to be congenital, except one in which the history was obscure, but which was not proved not to be so. Allowing this to be the case, the congenital occurrence of such tumours constitutes their most valuable diagnostic feature. The diagnosis lies between hernia, hydrocele, encephaloid cancer, and tubercular disease of the testis. It would seem easy to exclude the two former, though two of the cases recorded in this paper were mistaken for hydrocele. Robert speaks of a case of congenital cancer of the testis, but otherwise the two latter affections seem not to be known to occur congenitally.

In the '*Annali Universali di Medicina*,' 1866, vol. 196, p. 225, Dr. Melchiorj describes the varieties which occur in the mode of obliteration of the "funicular process" of the peritoneum, and the varieties of hydrocele which are thus occasioned. He divides this process into an inguinal portion, contained in the spermatic canal, and a scrotal portion. The closure of the funicular process commences usually from several points, corresponding to the upper end of the testicle, the external and internal rings, from which the obliteration proceeds in all directions, till the whole is closed. The mode, however, may vary, and different portions may remain unobliterated. In the examination of the bodies of young children the following conditions are found, viz. the canal is (1) entirely pervious and communicating with the peritoneum; (2) ob-

structed at the internal ring, and entirely open below; (3) the whole inguinal portion obliterated, the scrotal portion open; (4) the commencement just above the testicle obliterated, and all the rest open, and either communicating with the peritoneum, or, again, obstructed at the internal or external ring; (5) closed in its scrotal part and at the internal inguinal ring, while the rest is pervious through the external ring; (6) closed from the testicle to the external ring, but communicating from the peritoneum through the spermatic canal as far as the external ring. Following on this division, he gives the following classification of hydroceles of the tunica vaginalis:

- | | | |
|---|---|--|
| 1. Hydroceles communicating with the peritoneum | { | Complete or testi-funicular. |
| | | Partial or funicular { 2. Scroto-inguinal. |
| | | 3. Inguinal. |
| 2. Hydroceles not communicating with the peritoneum | { | 4. Complete testi-funicular. |
| | | 5. Scrotal testi-funicular. |
| | | 6. Testicular. |
| | | 7. Complete funicular. |
| | | Partial funicular. { 8. Scrotal funicular. |
| | | 9. Inguinal funicular. |

In all, 9 varieties, 3 communicating with the peritoneum, and 6 not communicating. The communicating, or, at least, the ordinary "congenital" form, may be changed into non-communicating by obliteration of the orifice, but the opposite change never takes place.

The author then proceeds to distinguish between the "primitive" form of a hydrocele, or that which results from the mere repletion of the cavity in which it occurs, and the "secondary" changes of form which take place from irregular distension of various parts of the primitive sac. These changes are, he says, important in practice. He then proceeds to describe the peculiarities of each of the 9 forms.

I. As to communicating hydrocele:

1. The complete communicating (or congenital) hydrocele, which may, by closure of the canal, be converted into a common hydrocele. The serum is secreted either by the tunica vaginalis, the "idiopathic," or by the peritoneum, the "symptomatic," form. The latter is, according to his observations, far the more common. The volume of these hydroceles rarely exceeds the "primitive," since when the tunica vaginalis becomes filled it suffers no subsequent pressure, the serum having a free access to the peritoneal cavity. The volume of the hydrocele is liable to temporary variations from the same cause. For since the fluid in the scrotum has free access into the peritoneal cavity, a portion may gravitate into the abdomen at various times. This form of hydrocele is very rarely met with in adult life, for the disease generally makes its appearance soon after birth, and in the early period of life the foramen of communication usually closes, while if it does not it most likely enlarges so far that hernia takes the place of the hydrocele.

He gives the following table of 21 communicating hydroceles to show the ages of the patients and the forms of the hydrocele:

	Total No.	Congenital Hydrocele.	Scroto-inguinal.	Inguinal.
From birth to 3 months	5	5	—	—
From the 4th month to the end of the 1st year	4	3	—	1
From the 2nd to the 5th year	4	3	1	—
„ 6th „ 10th „	2	2	—	—
„ 11th „ 15th „	3	2	1	—
„ 16th „ 25th „	1	—	—	1
„ 26th „ 46th „	2	2	—	—
	21	17	2	2

Twelve were on the right and 9 on the left side. Four cases refer to 2 individuals, 1 an infant of 7 months, the other a boy of 4 years. In both the hydrocele appeared as consecutive on an attack of entero-colitis (symptomatic). He then gives the symptoms which distinguish this complete communicating or “congenital” form of hydrocele from other swellings, particularly the diffused hydrocele of the spermatic cord, which is the only one that presents any difficulty in diagnosis; and then proceeds to describe its 3 forms:—1. The complete hydrocele of the testicle and peritoneum, the only one described in the classical authors under the name of congenital hydrocele. Here he gives some interesting and rare cases of this form of hydrocele, viz. one in a child of 4 years of age, in whom the congenital form of hydrocele came on in its idiopathic mode from inflammation, as it seemed, of the portion of the tube contained in the spermatic canal, and disappeared under anti-phlogistic treatment; a second, in which a congenital hydrocele was found buried in the substance of a large varicocele; a third, in which the parts (in a child 8 months old) showed very plainly the congenital inversion of the testicle; a fourth, in a young man in which the tumour presented two lobes, one at the bottom corresponding to the testicle, and the other three times as large along the cord; a fifth, in which the tumour extended into the scrotum, but the testicle was arrested in the inguinal canal; a sixth, in which a common congenital hydrocele, appearing in a boy of 14 after enteritis, gave place, after exertion, to a hernia, the patient having refused to wear a truss. This being reduced with difficulty, a truss was applied. After wearing this for about five years the communication with the peritoneum was found to be obliterated, but there was a non-communicating testi-funicular hydrocele, which was cured by capillary puncture and application of tincture of iodine.

2. The next variety is that which he calls “communicating funicular scroto-inguinal hydrocele of the tunica vaginalis,” in which the testicular cavity of the tunica vaginalis is closed, and the tumour occupies the upper portion of the scrotum and the inguinal canal, is of an oblong form, and is separated by a sulcus from the testicle. If the communicating (funicular) portion of the tube is very narrow, there may be hardly any tumour in this part, and the scrotal portion be all that is at first seen. Malgaigne was, as he says, the first to describe this form in

his thèse 'Des Tumeurs du Cordon spermatique,' 1848. He admitted their theoretic possibility, and cited a case, but had never seen one. The author describes 3 cases which he had seen, and says that he has 3 times met with the state of parts allowing of this form of hydrocele in dissecting the bodies of young infants. In one of the cases seen during life, an infant 11 months old, he had the opportunity of examining the parts after death; the aperture between the funicular portion of the tube and the peritoneal cavity was very small, hardly admitting a probe. In none of the three had hernia preceded the hydrocele, so that they could not have been cases of accumulation of serum in an old hernial sac. This form of hydrocele is usually small, and of little inconvenience to the patient. The author believes it to be occasionally mistaken for hernia.

3. The third variety of communicating hydrocele is called 'funicular inguinal of the tunica vaginalis.' In this case the only part of the tunica vaginalis which is not occluded, as it ought to be, is that lying between the two rings. In his dissections of children he has twice found this portion unobliterated and communicating with the peritoneal cavity by a small aperture, but empty in both cases. When the parts are in this state, as the person grows, the cavity becomes of a certain size, and may give rise to a fluid tumour, globular, not very large, reducible but gradually, and then reappearing gradually and not after coughing, sometimes not entirely for some days. Of this form he gives two examples during life, in one of which he had the opportunity of dissecting the parts.

In treating communicating hydroceles, the distinction between the "idiopathic" and the "sympathetic" or "symptomatic" must be kept in mind. If the hydrocele be sympathetic, and the fluid be formed in the peritoneal cavity, the application of a truss is always advisable, as tending to close the opening, prevent the gravitation of fluid, and thus cure the hydrocele, while the proper general treatment is used to remedy the condition of the peritoneum. If, on the contrary, the hydrocele has originated idiopathically, *i.e.* from congestion or inflammation about the cord, the application of a truss would be improper for the 3 following reasons:—1. It would probably set up too much pain in the inflamed parts to be tolerated. 2. If tolerated, it would oppose the passage of the fluid into the belly, and increase instead of diminishing the hydrocele. 3. Because, if the pressure of the truss were at any time removed, and the fluid which is accumulated in the tunica vaginalis pressed towards the belly, the orifice of communication would be reopened, and the effect of the truss thus destroyed. The pressure of the truss on the spermatic veins may also increase the tendency to effusion. He advises, therefore, to attempt to cure the hydrocele before applying a truss. He notices that even after the cure of such a hydrocele, hernia of the common form not infrequently occurs in consequence of the previous distension of the parts.

II. As to the non-communicating hydrocele. He gives the following statistical table to show the relative frequency of its 6 forms:

AGE.	Total No.	Complete testi-funicular.	Scrotal testi-funicular.	Testicular.	Complete funicular.	Scrotal funicular.	Inguinal funicular.
At birth or congenital	2	1	1	—	—	—	—
From birth to end of 1st year...	18	3	2	7	2	3	1
" 2 years to end of 5th year	29	2	7	14	3	2	1
" 6 " 10th "	17	1	3	6	2	2	3
" 11 " 20th "	24	3	4	7	3	3	4
" 21 " 30th "	30	2	7	12	2	6	1
" 31 " 45th "	60	3	15	35	3	3	1
" 46 " 60th "	54	4	14	31	2	2	1
" 61 " 70th "	19	—	5	13	—	1	—
" 71 " 88th "	8	—	1	6	—	1	—
	261	19	59	131	17	23	12
		Testi-funicular 78			Funicular 52		

Thirty-six were in 18 individuals, viz. 10 double testicular, 5 double scrotal testi-funicular, 1 testicular with complete testi-funicular on the other side, 1 testicular with scrotal funicular on the same side. Of the other 225 cases, the hydrocele was on the right side in 107 and on the left in 118.

We can only notice very cursorily a few of the more striking points in the rest of Sig. Melchior's treatise.

In the complete testi-funicular form (No. 4) he gives an instance of its having sent a prolongation up into the iliac fossa (as a "secondary" change from the primitive form), and alludes to an instance in which fatal peritonitis followed on the injection of this form of hydrocele. As to the scrotal testi-funicular (No. 5), he calls attention to its occasional large size, extending even to the pubes and penis, and to its frequent division into 2 parts ("hydrocèle en bissac"). He says that, in examining the bodies of 60 individuals from 45 to 80 years of age, he found in 4 a state of the tunica vaginalis which would admit of the complete testi-funicular form, and in 5 of the scrotal testi-funicular hydrocele. With respect to testicular (common) hydrocele (No. 6), he gives an instance of the partial obliteration of the common cavity which may take place from the injuries by which this disease is occasionally caused. Cystic hydroceles of the cord form his next 3 divisions, and he shows that in rare cases more than one of these cysts may exist in the same cord. On p. 266 he lays down rules for diagnosing those cysts which are the unobliterated remains of the fœtal process of peritoneum from those which are formed in obstructed hernial sacs or in the areolæ of the cellular tissue. The complete funicular hydrocele (No. 7) may, as he notices, extend so low down as to cover the testicle and (perhaps in the same subject) so high up as to project into the belly, where it ends in a rounded projection. Of this hydrocele and of the scrotal funicular, he distinguishes 3 grades as they proceed downwards in the scrotum, which is their natural progress (peri-testicular), viz.—1. The testicle is covered only in front; and

by transmitted light can be seen to cast no shadow into the transparent liquid. 2. The testicle is enclosed also on its lower side, and is found at the outer and lower part of the tumour, where it can be distinguished by the finger and by transmitted light. 3. The testicle is buried in the tumour, and cannot be felt with the finger; it can be distinguished by transmitted light, and is then seen to be only partially implicated in the swelling, not entirely, as in common hydrocele.

Instances of each of these grades are given. The last (inguinal-funicular) form favours the occurrence of hernia by distending the canal, and is, in fact, often associated with hernia. It has a tendency to be driven down the cord, either by the action of the muscles or the presence of a hernia, and so to be changed into the former variety. Of this he has seen 4 examples. It is desirable to favour this tendency by the application of an appropriate truss. Instances are given where this hydrocele has been complicated with undescended testicle.

So far the paper has dealt mainly with pathological details, the rest is chiefly surgical. It treats of the changes in transparency of the non-communicating forms of hydrocele; of the position of the testicle and cord in the same forms; of the complications with varicocele, with diseases of the testicle and cord, and with hernia; and then passes on to the etiology of the disease. Amongst the most frequent causes he enumerates—(a) At all ages, contusions, inguinal hernia, the pressure of a truss, entero-colitis with participation of the peritoneum and sub-peritoneal tissue. (b) In infancy, erysipelatous or erythematous redness, long-continued crying. (c) In boys, exertions of all kinds, running, leaping. (d) In young men, exertions, masturbation, excessive coitus, varicocele, long maintenance of the erect posture in some occupations, gonorrhœal epididymitis. (e) In middle life, gonorrhœal epididymitis, induration of the epididymis and testicle from previous inflammation, cystitis, hæmorrhoids, varicocele, relaxation and inordinate length of the scrotum. (f) In old age, the same 4 last-mentioned causes, with stricture, hypertrophy of the prostate, and constant coughing.

Want of space compels us to omit any abstract of Sig. Melchiorj's experience on the various methods of treating the disease, as well as of the second part of his paper, which treats of the cystic tumours of the testicle and cord which are not formed in the tunica vaginalis. For these matters we must refer to the original.

The following extracts refer to military surgery:

"Resection of the Ankle for Gunshot Wound."—A communication on this subject, by Langenbeck, illustrated by cases, is to be found in the 'Berlin Klin. Wochenschrift,' 1865, No. 4, showing the advantages of this operation over amputation in military practice when the case is appropriate.

The number of cases reported is 5, one of which died of hospital gangrene. In one of the remaining cases the cure was perfect, with an ankylosed and quite useful foot. The 3 others remained under treatment, but in 2 at least of them the cure appeared nearly complete.

In one of these cases as much as 4 inches of the tibia was removed; in another, the whole astragalus. When either bone is not splintered,

Herr Langenbeck thinks it better to leave it, even if fractured. He carefully separates the periosteum from the ends of the bones by means of a raspatory, or fine elevator, and unites the wound, except a small part below, putting the limb up then in a plaster of Paris splint. To divide the bones he uses a kind of keyhole saw, of his own invention (Stichsäge). He thinks it a matter of great importance not to interfere with the interosseous membrane, as the functions of this membrane are very analogous to those of periosteum, and its ossification after the operation tends greatly to consolidate the parts. Including Neudörfer's 2 cases (in 'Langenbeck's Archiv,' 1864, p. 559), the author counts 7 cases of resection of the ankle performed in Schleswig, with 1 death, 3 complete and 3 probable recoveries.

Selections from the Circular No. 6, issued from the Surgeon-General's office of the United States Army, and entitled, "Reports on the extent and nature of the materials available for the preparation of a Medical and Surgical History of the Rebellion." (Philadelphia, 1865.)—In order to compare the extent of materials included in these reports with those which exist in reference to former wars, the following comparisons are instituted:

"In comparing the number of cases of some important injury, as, for example, gunshot fractures of the femur, it is found that in the French Crimean army there were 459 such injuries, and in the English army 194, while over 5000 such cases have been reported to this office. Or, if one of the major operations is selected for comparison, as excision of the head of the humerus, the Crimean returns give 16 of these excisions in the British and 38 in the French army, but the registers of this office contain the detailed histories of 575 such operations." (p. 2.)

We shall lay before our readers in this place such extracts as may be useful for the purpose of general reference. Individual cases of much interest will be found in the report, but for these we must refer to the original.

The following is the table of amputations, as far as hitherto ascertained:

"The histories of 13,397 amputations for gunshot injury have been examined and recorded, and the final results have been ascertained in 9705 cases.

Amputations of the superior extremity.	Recovered.	Died.	Total.	Per cent. of mortality.
Fingers and parts of the hand	1778	29	1807	1'60
Wrist	34	2	36	5'55
Elbow	19	0	19	—
Forearm.....	500	99	599	16'52
Arm	1535	414	1949	21'24
Shoulder-joint	144	93	237	39'24
Total of upper extremity	4010	637	4647	13'70
Amputations of the inferior extremity.				
Toes	784	6	790	'75
Partial amputations of the foot.....	108	11	119	9'24
Ankle-joint	58	9	67	13'43
Leg.....	1737	611	2348	26'02
Knee-joint	52	64	116	55'17
Thigh.....	568	1029	1597	64'43
Hip-joint	3	18	21	85'71
Total of lower extremity	3310	1748	5058	34'55
Aggregate	7320	2385	9705	24'57

We will now give brief notes of the reports here presented on the subject of excisions (pp. 54—78):

"Excisions of the wrist."—The 35 cases included in this category were all examples of partial excision. In 27 the ends of the radius or ulna, or of both, were removed; and, in some instances, shattered fragments of the upper row of carpal bones. In 8 the greater part of the carpus was excised. Death took place once from pyæmia, and twice from exhaustion from protracted suppuration and irritative fever; 26 cases are reported as recovered. In 2 cases amputation of the forearm became necessary. The reports are unsatisfactory in relation to the amount of mobility left in the hand, and the cases are now under investigation with reference to this point."

"Excisions of the elbow."—The returns for three fourths of the entire period give 315 cases of excision of the elbow, and the results are ascertained in 286 cases. In 16 cases amputation of the arm became necessary; 62 cases terminated fatally, or 21'67 per cent., which is a mortality a fraction greater than that resulting from amputations of the arm. This result is altogether opposed to the Schleswig-Holstein and Crimean experience, and will doubtless be modified when the statistics are completed. It may be ascribed partly to the fact that the returns for the earlier period of the war include quite a large proportion of partial excisions, which are far more hazardous than complete removal of the articular surfaces."

"Excisions of the shoulder-joint."—Nearly all of the cases that have been reported during the war have been recorded. The results are given in the following table:

	Primary operations.	Secondary operations.
Died	50	115
Recovered.....	160	183
Results undetermined	42	25
	<hr/> 252	<hr/> 323
Aggregate	575	

The per-centage of mortality is 23·3 in primary cases, 38·59 in secondary cases, or a mean ratio of 32·48. The ratio in amputations at the shoulder-joint is 39·24, a per-centage of 6·76 in favour of excision. Of 36 cases of gunshot fracture of the head of the humerus, selected as favorable cases for the expectant plan, and treated without excision or amputation, 16 died, or 44·4 per cent., a ratio in favour of excision of 11·96 per cent. But it is superfluous to offer further proofs in behalf of this admirable operation. . . . Generally the operation has been done in cases in which the head of the bone was alone implicated, and consisted simply in a decapitation of the humerus. Partial excisions have been seldom practised. The method commonly preferred was that by a single vertical incision, though some operators raised a V-shaped flap, and all endeavoured to include the wound made by the ball in the incision. It is frequently mentioned that the long tendon of the biceps was preserved. In 29 cases portions of the clavicle or of the coracoid and acromion process and neck of the scapula were excised, as well as the head of the humerus. Only 4 of these cases terminated fatally, and the average result in the recovered cases was as satisfactory as the ordinary result in decapitation of the humerus.

"When the shaft of the humerus has been extensively shattered our surgeons have not been deterred by the prohibition of Guthrie, but have frequently removed the head with even five or six inches of the diaphysis. . . . Excellent results are obtained after excision of the head with very considerable portions of the shaft." (A case and photographic drawings are appended, where the head and upper third of the shaft were removed, together with a fragment of shell measuring 4 inches long by 1 broad.)

"*Excisions of the ankle-joint.*—Of 22 recorded cases 8 were excisions of the tibio-tarsal articulation, and the remainder were nearly all ablations of portions of the tarsal bones. Of 18 terminated cases 12 recovered and 6 died. . . .

"It appears that the judicious use of the gouge and bone forceps is admissible in gunshot-wounds of the ankle-joint; but that the formal excisions are rarely successful."

"*Excisions of the knee-joint.*—During the late war complete excision of the knee-joint has been performed 11 times. An abstract of each case is here furnished." [This abstract shows that out of 10 authentic cases only 1 recovered, and in that case the following is all that is said as to the usefulness of the limb:—"He was not then able to walk (*i. e.* nine months after the operation), but subsequently did so, with the aid of a cane." In the eleventh case the report says, "The suc-

cess claimed is so extraordinary as to suggest some doubts of its authenticity.”]

“Seven partial excisions of the knee-joint for gunshot injury have been reported.” [In 5 of these cases, where the knee-joint was known to have been opened, the patient died.] “In 2 cases the head of the fibula was excised and portions of the head of the tibia. Both recovered. In these cases it does not clearly appear that the articulation was opened.”

Excisions of the head of the femur.—The report first states that there were on record, previous to this war, 12 cases of this excision for gunshot injury, with only 1 success. A tabular statement is then given of 32 of these excisions which had been reported to the Surgeon-General’s office; and this table also serves to illustrate the form in which these records are kept. Of the 32 cases only 4 recovered; in 1 the result is not stated. The limb seems to have been useful in all the cases of recovery except in one, where it is said, “the limb was disposed to abscesses on any unusual exertion.”

The report expresses no opinion on the value of this operation, merely pointing out “the uniform fatality of gunshot fractures of the head and neck of the femur when abandoned to the resources of nature, and the excessive mortality of amputation at the hip-joint for gunshot injury.”

“*Excisions in the continuity of the long bones of the extremities.*—The great surgeons who have done most towards substituting excision for amputation in gunshot injuries of the joints have almost unanimously condemned excisions of the continuity of the long bones in the treatment of gunshot fractures. The surgical histories of the Crimean war, of the Schleswig-Holstein campaigns, and of the Indian mutiny, record a few successes in resections of the shafts of the humerus, the tibia, and the bones of the forearm; but this class of operations could scarcely be considered as admitted among the approved and established procedures of surgery. The late war has furnished ample materials for arriving at definite conclusions on this subject, and for determining how far these measures can claim to be included in that true conservatism which has for its first object the saving of life, and refuses to jeopardise lives in order to save limbs.

“These materials are yet to be thoroughly analysed. So far as examined, this evidence is, on the whole, unfavorable to excisions in the continuity.

“A synopsis of the results at present attained is presented in the following table:

"Table giving the number of cases of excisions for gunshot injuries in the continuity of the bones of the extremities, from the commencement of the war to July, 1864, and the results, as far as ascertained.

	Died.	Recovered.	Amputations ultimately required.	Result not yet determined.	Total.	Per-centage of mortality in finished cases.
Excisions in the continuity of the humerus	42	133	7	79	261	24'00
Ditto ditto radius	11	93	3	67	174	10'57
Ditto ditto ulna	16	100	3	51	170	13'79
Ditto ditto both radius and ulna	5	24	1	10	40	17'24
Excisions of the metacarpal bones ...	2	30	...	18	50	6'25
Excisions in the continuity of the femur	32	6	...	24	62	84'21
Ditto ditto tibia	11	48	5	20	84	18'64
Ditto ditto fibula	15	60	3	15	93	20'00
Ditto ditto both tibia and fibula	1	4	1	2	8	25'00
Excisions of the metatarsal bones ...	5	26	...	2	33	19'23
Totals	140	524	23	288	975	26'71

"After excisions of portions of the shaft of the humerus for gunshot fractures a number of patients have certainly obtained very useful limbs. But the mortality after the operation is 3 per cent. greater than after amputation of the arm. The fifty-two preparations at the Army Medical Museum, illustrating this resection, indicate the frequency with which it is followed by secondary amputation or a fatal result.

"Excision in the continuity of both bones of the forearm has a larger mortality than amputation of the forearm.

"The specimens at the museum and the records afford emphatic arguments against formal excisions of the shaft of the femur. With one exception, the few cases that recovered were those in which, after the removal of detached fragments, the least amount of operative interference had been practised.

"The mortality rate after excisions of the tibia and fibula is less than after amputation, as the statistics stand; but the number of cases in which the result is still pending is unusually large." . . .

"One of the registers of excisions is devoted to the cases of trephining after gunshot injuries of the cranium. The results are here recapitulated in a tabular form.

"Table exhibiting results of cases of gunshot fractures of the skull in which trephining was performed.

" Number of deaths	60
" recoveries	47
" cases in which, as yet, results have not been obtained ...	14

Total number of cases 121

"Table exhibiting results of cases of gunshot fractures of the skull, in which fragments of bone were extracted.

"Number of deaths.....	61
" recoveries	53
" of cases in which, as yet, results have not been obtained ...	19

Total number of cases 133

"The following table exhibits the number of cases of ligation of the larger arteries, from the beginning of the war to March, 1864:

	Number of cases recovered.	Number of cases died.	Total.	Ratio of mortality.
Common carotid	12	37	49	75·71
External carotid.....	...	2	2	100·00
Subclavian	7	28	35	80·00
Axillary'.....	3	21	24	87·5
Brachial	53	11	64	17·18
Radial.....	12	2	14	14·28
Ulnar	9	2	11	18·18
Common iliac.....	...	3	3	100·00
Internal iliac	2	2	100·00
External iliac	2	14	16	87·5
Femoral	25	83	108	76·85
Profunda.....	1	6	7	85·71
Popliteal.....	4	12	16	75·00
Anterior tibial.....	11	5	16	31·25
Posterior „	13	6	19	31·57
Peroneal.....	...	2	2	100·00
All others*.....	11	4	15	26·66
Aggregate	163	240	403	—

"The new hæmostatic process recommended by Prof. Simpson was adopted in a few cases with favorable results."

"Compound Fracture of the Thigh treated without Amputation in the Southern Army" ('Richmond Med. Journ.,' Feb. 1866. Quoted in the 'New York Med. Journ.,' April, 1866.)

Recoveries 116. Deaths 105.

Average period of recovery	Days.
Greatest „ „	104
Least „ „	255
Average period of death	41
Greatest „ „	52
Least „ „	185
	1
Average amount of shortening	Inches.
Greatest „ „	1·9
Least „ „	5·0
	0·5

* Viz., temporal artery 3, occipital 2, facial 2, intercostal 2; internal mammary, thoracica longa, gluteal, superior profunda of the arm, posterior circumflex of axillary, dorsalis pedis, 1 each.

The number of injuries from gunshot wounds in the Southern armies during the years 1861-2 were—field, 29,569 cases, 1623 deaths and 493 discharges; hospitals, 47,724 cases, 2618 deaths and 742 discharges; killed in battle 8087.

“On the application of Sutures to Bone in recent Gunshot Fractures, with Cases, &c.” By Benjamin Howard, M.D., late Assistant-Surgeon, Regular Forces, United States Army (*Med.-Chir. Trans.*, xlviii, p. 245).—In this communication Dr. Howard calls attention to the feasibility, in some rare cases, of uniting the fragments of a gunshot fracture by wire sutures introduced through holes drilled above and below. The operation is something like that occasionally used for ununited fracture. It consists in cutting down on the seat of injury, removing the loose spiculæ, cutting a clean section of each fragment with a saw, then drilling two holes above and below the section, and introducing a twisted wire suture through each.

Dr. Howard makes use of annealed iron wire, leaving it short in the wound; and he attempts to limit the incisions and to spare the periosteum as much as possible.

The advantages which the method is thought to possess consist—“1st, negatively, in the absence of everything which may act as a foreign body and dangerous source of irritation; 2nd, positively, in securing complete coaptation and perfect rest.” On the importance of the latter consideration, in the rough movements often necessary after gunshot injuries in war, Dr. Howard especially dwells. He gives sufficient general directions for his operation, and notes 2 cases, in 1 of which it was completely successful, promising further details, and an account of his whole experience, in future papers. Dr. Howard allows that the number of cases to which his method is applicable must be very limited, either in civil or military practice. Besides gunshot wounds Dr. Howard mentions cases of compound fracture, of Pirogoff's amputation, and of fracture of the jaw, as appropriate for the use of retentive sutures.

In the ‘American Journal of the Medical Sciences,’ Jan. 1866, p. 139, will be found the report of a case in which the entire humerus and the heads of the ulna and radius were removed by Dr. Cutler, of Newark, New Jersey, on account of disease of the bones following a gunshot wound. The wound had penetrated the left shoulder-joint, fracturing the head and neck of the humerus, which portions of bone were excised three days after the injury. This was on Nov. 30, 1863. Ten days after the operation an abscess formed, and was opened near the elbow-joint, and other openings afterwards formed, revealing extensive necrosis of the shaft of the humerus and bones of the elbow-joint. On July 21, 1864, Dr. Cutler operated for the removal of the entire humerus and the heads of the radius and ulna. He continued the incision made in the first operation down the “ulna line of the arm to the forearm” (*sic in orig.*), and removed the bone with very little injury to the surrounding parts. No ligatures were required. The tubercle of the radius was left with the insertion of the biceps. The case did

well, and the wound had healed three weeks after the operation. "The carpal, metacarpal, and digital muscles were left powerfully subservient to the will for grasping, holding, and pulling, though there was some paresis of the 'extensor carpi digitorum.'" [By this name, which Dr. Cutter repeats twice, we understand him to mean the extensor communis digitorum.] The arm was, of course, quite flaccid; but the shortening was only an inch and a half. No distinct statement of the absence of any bone in it is made; but it is said to be "extremely flexile and ungovernable." An apparatus is described by which the arm was steadied, india-rubber springs being applied to the apparatus to act on the forearm. The man's condition is thus described on the second anniversary of his wound:—"He was here a few days ago, took an arm-chair, and swung it around at an elevation of 45° , almost at a right angle with the body. He is improving in the use of his arm." We infer from the description of the case that, had it been the right arm, the hand would have been perfectly available for writing, or in a female for sewing, &c.

"On the use of Plaster of Paris Splints in Military Surgery, as Dressings to be applied on the Field itself, before transport to Hospital." (See Neudörfer, in 'Langenbeck's Archiv,' vi, p. 508 et seq.)—The clothes are to be preserved on the limb, with such openings as will expose the wound or wounds, and 2 layers of plaster of Paris spread ready on stuff (not on bandages), and strengthened with "veneering wood," will serve to keep the parts from all risk of disturbance. This plan the author thinks would save many patients from subsequent operation.

In the 'American Journal of the Med. Sciences,' July, 1865, p. 61, Dr. Atlee communicates a paper, by Dr. Pfeiffer, on "Hospital Gangrene treated by the local application of Buttermilk." Only one case is reported, in which a gunshot wound of the lower extremity, and a bed sore which had formed during the treatment, were both sloughing and spreading under other treatment, until they were dressed by syringing with buttermilk, and then steeping in lint impregnated with the same. The patient ultimately recovered. Dr. Atlee refers to a paper, by Dr. Jackson, in the April number of the same periodical, "On the use of Sugar and Lactic Acid in the Animal Economy," and says that, not being able to obtain any sour milk, as recommended by Dr. Jackson, to apply to the gangrenous wound, buttermilk was substituted. Since its employment in this case it has been universally used as a local application at Dr. Atlee's hospital in all cases of sloughing wounds, and with the most satisfactory results. It has also been used as a dressing for stumps immediately after amputation, and, as Dr. Atlee believes, with the effect of keeping parts free from odour that would, under other applications, have been offensive and sloughing.

"Hospital Gangrene" ('Am. Journ. Med.,' &c., April, 1866, p. 351).—Dr. Kempster, referring to the reports in earlier numbers of this journal, expresses his dissent from the doctrine that the constitutional

symptoms are secondary, or dependent on the severity of the local disturbance; inclining, on the contrary, to believe that the disease is constitutional from the commencement, and ushered in by prodromata in the form of headache, loss of appetite, general uneasiness, a dirty, glazed tongue, hot skin, frequent pulse, and constipation. These symptoms occurred from 12 hours to 3 days before the local effect was apparent, and they continued to increase down to the invasion of the gangrene. They would then partially subside, and by the time the local manifestations were subdued the patients felt improved in health and spirits, but were much weakened by the attack. The premonitory symptoms were sufficiently clear to enable the onset of the disease to be frequently predicted. Between 40 and 50 cases occurred at the hospital (at Baltimore) to which Dr. Kempster was attached, of which 3 died. The treatment which he found most successful was to cleanse the wound thoroughly, then apply the strong nitric acid, and afterwards dress it with iodide of potassium ointment. Other means were tried—turpentine, bromine, permanganate of potash, Labarraque's solution, sugar, &c.—but they were less satisfactory. Internally stimulants and tonics (chiefly the muriated tincture of iron) were given, and morphia to ease pain and produce sleep.

Dr. Packard, of Philadelphia, gives his views "On Hospital Gangrene, and its efficient treatment," in the 'American Journal of the Medical Sciences,' Jan. 1865, p. 115. In his description of the disease, he lays especial stress on the local heat (which he says is an exceedingly prominent symptom, so that the sore will steam in cool weather while the pungency of the heat may be even unpleasant to the hand), on the peculiar nauseousness of the discharge, and on the appearance of exuberant pale granulations which are seen when the slough is vigorously sponged. These, however, are not really granulations, but, on the contrary, small projections of tissue left between the parts that have sloughed.

Dr. Packard regards the disease, with Blackadder and others, as strictly local, and asserts that when amputation is required the stump will do as well as in any other kind of case. The cause of the disease is obscure. It is sometimes traceable distinctly to contagion, but is frequently seen to originate spontaneously; and though the grouping together of grave surgical cases and bad hygienic conditions in general favour its origin, still it often spares wards in this condition, while, on the other hand, it frequently arises in places neither crowded nor unwholesome. The disease, however, is so purely local that even if an artery be laid open by it, the vessel may be cut down upon and tied higher up, and the new wound do well.

The first indication of treatment is to remove all putrid and putrescent matter from the wound by rolling up the sloughing connective tissue in the forceps, pulling it away as far as possible, and then completing its removal by rough sponging. This should be repeated again and again (under chloroform if necessary) until every portion of the surface of the wound is perfectly cleaned. It will do no harm afterwards to "disinfect" the surface with chlorinated soda, bromine, or permanganate of potash, but this does not seem essential. The second indication is to prevent

the recurrence of the sloughing. For this purpose Dr. Packard has found nothing so good as sugar, which, being a hydrate of carbon, does not give up any oxygen to the tissues, and which is well known for its preservative powers in the case of meats and fruit. It may be applied either in the form of syrup, or, better, the wound may be covered with a thick layer of powdered white sugar. A mixture of pulverized charcoal with the sugar answers very well when the odour does not immediately disappear after the cleansing. Coal oil, turpentine, or any other carbo-hydrogen, if pure, would answer, but the sugar is less offensive and does not give pain. Sugar seems also to act as a prophylactic, and should be applied to wounds not yet sloughing in wards visited by the disease. It is possible that the cleansing may have to be repeated, but usually one application suffices when the whole surface can be got at. In order to prevent the spread of the disease by contagion, no wound should be dressed with the things which have been used for another.

In the 'Amer. Journ. of the Med. Sc.,' Jan. 1865, p. 274, is a paper by Dr. Bartholow, United States Army, extracted from the 'Cincinnati Lancet,' on the subject of hospital gangrene. He divides hospital gangrene into 2 forms—the true, transmissible by contagion, and in which the local lesion precedes the constitutional or typhoid symptoms; and a second, the "pseudo-gangrene," in which the sloughing depends on the constitutional cachexia dependent on some of the many depressing influences to which soldiers in the field are liable; in these cases the variety and extent of the local lesion will depend on the degree in which scorbutus and malaria have vitiated the blood. In the pseudo-gangrene the sloughs are never so extensive, the boundaries between healthy and diseased textures are more clearly marked, there is a less vivid inflammatory zone around the slough, and the gangrene spreads more slowly and equably. In the first form we may rely on topical applications, escharotics, the actual cautery, &c., the disease being originally local, while in the second form topical medication is of subordinate importance, the chief point being to correct the constitutional dyscrasia. The local form of gangrene can be treated efficiently by carefully dissecting off the sloughs and cauterizing the exposed surface with bromine (though the author rather dissuades its use on account of the intense pain it produces), or nitric acid, or permanganate of potash, or chloride of zinc. But he holds the oil of turpentine to be much superior, since it will, as he says, dissolve out the sloughs and change the action of the tissue. The turpentine is to be applied on a piece of lint cut to the exact size and shape of the sore, and steeped in the oil. The borders of the wound are to be defended with sweet oil.

APPENDIX.

"Successful Operation in a case of Subclavian Aneurism." By A. W. Smyth, M.D., House-Surgeon, Charity Hospital, New Orleans, La. (From the 'New Orleans Med. Record,' i, No. 1, May 15, 1866).—"William Banks, a mulatto, born in the State of Florida, in 1832, was admitted into the Charity Hospital, New Orleans, La., on the 9th of

May, 1864, affected with aneurism of the right subclavian artery. He had been employed in the capacity of steward on the United States steam-transport 'Suffolk,' and dates the commencement of his ailment from a collision of this ship with the steamer 'Continental' at Sabine Pass, in the month of February last. In his efforts to save himself, he tried to board the latter ship, and, holding by the anchor, he sustained, for a time, his own weight and that of another man who clung to him in a similar attempt. To this over-exertion he attributed the origin of his disease. He felt pain in the shoulder from that time, and in about a month he noticed a small throbbing tumour making its appearance above the clavicle.

"This tumour, gradually enlarging, had reached the size of a small orange at the time of his admission into the hospital, was circumscribed and round in shape, filling up the posterior inferior triangle of the neck; strong pulsatory movement was visible even at some distance, and on applying the ear to its surface a loud bellows sound was heard accompanying the arterial beat. No difference was detected in the pulsation of the two radial arteries at the wrist, and there was nothing abnormal in the sounds of the heart.

"He complained a good deal of severe pain and numbness in the forearm and hand; for the past 2 months he had been unable to lie down or stand erect, but was compelled to lean forwards continually for relief, and to sleep sitting in a chair with his head resting on the side of the bed or on another chair placed opposite.

"The case was seen by a large number of medical gentlemen, none of whom entertained any doubt as to the nature of the tumour, or the necessity of an operation for the patient's relief. Some diversity of opinion did, however, exist as to the best method of proceeding to adopt.

"Dr. D. L. Rogers, of New York, who was present, strongly urged the ligature of the innominate and carotid arteries at the same time, as being an improvement on former operations. The tying of the latter artery would intercept a retrograde current through it, which he supposed had occurred in former cases, preventing occlusion on the distal side of the ligature, and thereby causing fatal secondary hæmorrhage. This proposal seeming a good one, was determined upon, for although ligature of the innominate in every previous case has been followed by a fatal result, it must be admitted that this operation has been attended with a greater degree of success (if we measure by the days patients survived it) than any other, offering an equal prospect of effecting a cure. And to my mind the Hunterian method promised at least relief from present pain, while any attempt to arrest the circulation through the aneurism by ligature on the distal side might not have accomplished even so much. The aneurism continued to increase from the date of admission; and, 6 days after, on the 15th of May, assisted by Dr. Rogers, Drs. Holliday and Boyer of this city, Surgeons Bacon and Orten, of the United States Army, and the resident students of the hospital, I performed the operation suggested by the first-named gentleman.

"A longitudinal and transverse incision having been made after the

method of Mott, no difficulty was experienced in placing a ligature on the innominate artery a quarter of an inch below its bifurcation, and another on the carotid, an inch above its origin. On tying the former all pulsation stopped in the tumour. The temperature of the arm and hand was immediately increased, and in about 48 hours after the operation a perceptible undulatory motion was discovered in the arteries of the wrist. But little diminution was yet apparent in the size of the aneurism, and, except some slight febrile action, soon subsiding, no other constitutional disturbance was observed. The patient was now able to lie down for the first time in two months, and all went on favorably until the 29th. He complained, however, for the first few days of a burning pain in his arm, different (he said) from the numbness experienced before the operation. The ligature had come away from the carotid artery the day before.

"On the 29th of May, 14 days from the time of operating, a severe hæmorrhage occurred, causing syncope rapidly, and ceasing of its own accord. At least 16 ounces of blood must have been lost in the space of 3 or 4 minutes. To prevent its recurrence the wound was filled with lint, and a small weight placed upon it to effect compression. Slight hæmorrhage, however, to the extent of 2 ounces at a time took place on the 2 following days, and was stopped by the nurse pressing the lint more firmly into the wound.

"Finding that something more was necessary to check the bleeding, the idea suggested itself to me of filling the wound with small shot, as a more effectual means of compressing the artery. This expedient, although not exempt as I could see from dangerous consequences, at the same time offered some advantages, the principal among which was, that the pressure of the shot on the artery might possibly aid in effecting its occlusion. In removing the lint for this purpose hæmorrhage recurred, and I found that the shot fully answered my expectations in checking it—so much so, that wishing to remove the ligature from the innominate, believing it now to be a useless source of irritation, I felt safe in pulling it away even against some resistance.

"A slight oozing, sufficient to stain the lint placed over the surface, followed for the two subsequent days, when it ceased, and all went on well for a fortnight more. The patient felt some difficulty in swallowing and an occasional desire to cough, about which, however, he made little complaint. The aneurism diminished rapidly in size, and pulsation became quite distinct at the wrist.

"The shot sinking gradually in the wound, I began to entertain some fears of its getting out of reach, and, on the 17th of June, I picked about half of it out with forceps, but in 5 hours, hæmorrhage returning, it was immediately replaced. Slight bleeding, however, still recurred at intervals of two and fifteen days and was checked without difficulty.

"On the night of July 5th, being sent for with the announcement that the patient was dying, I discovered, on getting to his bedside, that he had had a terrific hæmorrhage, exceeding in quantity the first, on the 29th of May; he had fainted, was pulseless and gasping in a frightful manner. The bleeding having ceased, I placed a compress of

lint over the wound and added the paper weight used before as additional security.

"In the morning, on visiting the wards, I was surprised to find him fanning himself; he was very pale, his pulse was 140 and weak, his voice, however, was strong, and he observed that if the bleeding could only be stopped he would yet do well.

"In endeavouring to discover the probable source of hæmorrhage I found, on referring to Mr. Erichsen's work on surgery, a great deal of valuable information on this question, which led me to form a most important practical conclusion regarding it. In the chapter on aneurism of the subclavian,* after giving statistics of ligature of this artery in the first part of its course, Mr. Erichsen says—'This table is, to my mind, conclusive as to the merits of the operation, the patient having in every case but one been carried off by secondary hæmorrhage from the distal side of the ligature, in consequence of the close proximity of numerous collateral branches; and in this exceptional case the operation, although performed with the utmost delicacy and skill, proving fatal from pericarditis and pleurisy before the period at which secondary hæmorrhage might have been expected. Mr. Liston in one case ligatured the root of the common carotid as well as that of the subclavian,' an operation very analogous to the present, 'hoping in this way to diminish the risk of the supervention of this fatal hæmorrhage by arresting the current of blood which, by sweeping into the carotid, passed the mouth of the subclavian, necessarily washed away any coagulum that would otherwise have formed in this artery. But his expectations were not realised, hæmorrhage taking place as usual, and from that portion of the (subclavian) artery which lay on the distal side of the ligature, the blood having been carried into this part of the vessel in a retrograde course through the connection existing between its vessels arising from it at this point and those on the opposite side of the head and neck.'

"It is evident, on examination of these vessels, that the vertebral is by far the most important, from its size and communication with its fellow of the opposite side, in carrying on this fatal retrograde current, and its direct connection with the brain offers an explanation for the peculiarly rapid occurrence of syncope after bleeding, so well marked in the present case. In this way, no doubt, hæmorrhage was arrested in previous cases, for its repetition has been a striking feature in almost all of them.

"The danger of secondary hæmorrhage to be apprehended from a collateral branch carrying on the anastomosing circulation close to the distal side of the ligature has also been noticed by Mr. Erichsen.

"In mentioning the accidents after ligature, he remarks†—'I think, however, that the presence of a collateral branch in close proximity to the distal side of the ligature—more especially if it be one that serves to carry on the anastomosing circulation—will be found to have a decided tendency to prevent the formation of an internal coagulum.'

"That the vertebral carries on almost the entire anastomosing circu-

* Eng. ed., p. 564, Am., p. 549.

† Eng. ed., p. 157, Am., p. 171.

lation into the subclavian artery, is yet more clearly shown by the occlusion of the common carotid, which has taken place after ligature of the innominate. I was ignorant of this fact at the time of operating on the present case, but it is readily understood by supposing that the current in the larger carotid was completely checked by that from the more active vertebral, for these currents oppose each other in the subclavian when carrying on the retrograde circulation. If this is the explanation, it is interesting in showing how occlusion may sometimes be brought about.

"The fact that the duration of life has been greater after ligature of the innominate than after that of the subclavian near its origin, can also be accounted for by the greater distance from the seat of ligature in the former operation of the anastomosing collateral branch.

"From all these considerations I resolved to tie the right vertebral artery, before, if possible, another hæmorrhage should take place, at the same time entertaining great fears of the result, owing to the patient's reduced condition.

"On July 8th, 54 days after the first operation, with the assistance of my friend, Dr. P. C. Bower, of the Hotel Dieu, and the students of the hospital, I placed a ligature on the vertebral artery in the following manner:

"The head of the patient being thrown back and slightly turned to the left, an incision, two inches in length, was made along the posterior border of the sterno-mastoid muscle, commencing at the point where the external jugular vein crosses this muscle and terminating a little above the clavicle, the edge of the muscle being exposed and drawn to the inner side, the prominent anterior tubercle of the transverse process of the sixth cervical vertebra was readily felt and taken for a guide. Immediately below this, and in a vertical line with it, lies the artery. A layer of fascia was now divided, some loose cellular tissue with lymphatics and the ascending cervical artery were pulled to the inner side, and a separation was made between the scalenus anticus and longus colli muscles close below their insertion into the tubercle, when the artery and vein became visible, the latter was drawn to the outer side (this is important) and the needle passed around the former from without inwards.*

"No constitutional disturbance whatever was observed after this operation, which was much facilitated by the empty state of the vessels. On the following morning all the shot was removed from the first wound (having remained 38 days) and was found to weigh $2\frac{1}{2}$ oz. It had gone deeply into the neck and had probably ceased to press on the artery.

"A marked decrease in the circulation of the arm was now apparent, the slight pulsation at the wrist disappearing; coldness and œdema supervened and the brachial artery became occluded, feeling

* "The vertebral artery sometimes passes in front of the anterior tubercle of the sixth cervical vertebra, entering the foramen in the fifth transverse process. In this case it is easily found. In a subject in whom the right subclavian was given off beyond the left, returning behind the trachea, the vertebral branch entered the foramen of the seventh vertebra. These variations are worth remembering."

corded throughout its whole extent. I was somewhat alarmed for the safety of the limb, but in a few days these unfavorable symptoms began to subside and slight pulsation was again perceived in the radial artery.

"No further hæmorrhage having taken place after the second operation, the new wound healed rapidly; the ligature coming away on the 10th day. The first wound also closed, though more slowly, and the patient at present, Sept. 15th, is entirely well, excepting that he yet lacks perfect command over the muscles of his arm, which, however, he is rapidly regaining.

"The aneurismal sac has almost disappeared, but there still exists some noticeable swelling above the clavicle.

"The lessons drawn from this first successful case must be of great importance in future operations for the cure of subclavian aneurism. We have 20 recorded cases, in which ligature of the innominate or of the subclavian artery in the first part of its course, *without that of the vertebral*, have proved fatal, and it is reasonable to suppose that it would always prove so.

"In the present case it would have been a difficult matter to have reached the vertebral at the time of the first operation, owing to the size of the aneurism. Still I think it was possible (it would always be so in the upper part of its course), and the early occurrence of secondary hæmorrhage in some of the fatal cases shows the danger of delay.

"If the innominate and vertebral arteries should be tied at the same time, it would not do to omit ligature of the carotid also, since we have seen that its occlusion in other cases was only owing to the current from the vertebral. But if an interval should be allowed to elapse between the operations, it is a question whether the carotid might not be left to this occlusion. Statistics being so imperfect on this point, it is impossible to decide.

"It is highly probable that ligature of the vertebral will also render safe the operation on the subclavian in the first part of its course, and this might appear preferable in some cases to tying the innominate, as it would leave the carotid free."

In an article on the subject in the same number, Dr. Dowler, of New Orleans, translates a paper by M. Leon Le Fort, on the ligature of the trunk of the brachiocephalic and of the subclavian artery. M. Le Fort, after recapitulating briefly the heads of Dr. Smythe's case, proceeds to give a statistical account of the operations on these vessels. He enumerates 13 operations in all upon the innominate, viz., by Mott, Arndt of St. Petersburg, Bland of Sidney, Graefe, Hall of Baltimore, Hutin or Oran, Lizars, Cooper of St. Francisco, twice, Bugalsky (according to Velpeau), twice, Norman, and a surgeon referred to but not named by Dupuytren. Instead of the ligature of the innominate, the carotid and subclavian were tied by MM. Cuveillier, Rossi, Kuhl, and Liston. All these patients died; and all those of whom notes are preserved, died of hæmorrhage, except the patient of Arndt, in whom death took place on the 6th day, from inflammation of the aneurismal sac, the pleura and lungs.

In 9 cases the subclavian has been tied in the first part of its course, viz., by Colles, Haxden of Dublin, Liston, Mott, O'Reilly of Dublin, Partridge, Rodgers of New York, and twice by Auvert. All these died of hæmorrhage, supervening more rapidly than when the innominate was operated on, and proceeding, as it appears, in all cases from the distal end. This is held by M. Le Fort to be a strong support to the theory, that the fatal event is caused by the re-establishment of the circulation in the anastomosing branches, of which the vertebral is the most active; and that, by lessening the distance between the ligature and the vertebral artery, the danger is increased. Hence a strong motive for securing that vessel at first.

REPORT

ON

OPHTHALMIC MEDICINE AND SURGERY.

BY
THOMAS WINDSOR.

THE last two years have been prolific in new works, new editions, or further parts of works, on this branch of medicine. The French edition of Dr. Mackenzie's treatise on the diseases of the eye has been enlarged by a supplement published by Messrs. Mackenzie, Testelin, and Warlomont.* Third editions of Mr. Dixon's 'Guide' and of Mr. Jones' treatise, and further portions of Seitz's 'Manual' and of Wecker's treatise have been published.† We must also quote here, among larger works, a 'Handy-Book of Ophthalmic Surgery,' by Messrs. Laurence and Moon, Thiry's lectures on 'Ophthalmology,'‡ Magni's work,§ Fano's treatise,|| H. W. Williams's 'Recent Advances in Ophthalmic Science,' the Boylston Prize Essay for 1865,¶ lectures by C. N. Macnamara** and C. Schweigger†† on the use of the ophthalmoscope, and a comprehensive essay by X. Galezowski on affections of the optic nerve.‡‡

A. von Graefe, struck by the tolerance of *Aqua Chlori*, which was used at the eye-clinic as a prophylactic in respect to diphtheritis and blennorrhœa, made numerous trials of its power as a remedial agent.

* Paris, Masson et Fils, 1865-6 ('Ophth. Rev.,' ii, 314; iii, 111).

† 'Handbuch der gesammten Augenheilkunde,' von Dr. E. Seitz, fortgesetzt von Dr. W. Zehender, Erlangen, Enke; 'Études Ophthalmoscopiques, Traité théorique et pratique des Maladies des Yeux,' par L. Wecker, Paris, Delahaye ('Ophth. Rev.,' iii, 98).

‡ 'Ophthalmologie, Leçons données à l'Université de Bruxelles,' par M. J. H. Thiry, Bruxelles, Mayolez, 1865 ('Ann. d'Ocul.' lvi, p. 86).

§ F. Magni, 'Lezioni teoriche di Oftalmoiatria,' Bologna, 1864-66.

|| 'Traité pratique des Maladies des Yeux,' par le Dr. Fano, 2 vols., Paris, A. Delahaye, 1866 ('Ann. d'Ocul.' lv, p. 102).

¶ Boston, 1866.

** 'Lectures on Diseases of the Eye, referring principally to those Affections requiring the aid of the Ophthalmoscope for their Diagnosis,' 1866.

†† 'Vorlesungen über den Gebrauch des Augenspiegels,' Berlin, 1864.

‡‡ 'Étude Ophthalmoscopique sur les Altérations du Nerf Optique et sur les Maladies cérébrales dont elles dépendent,' Paris, Leclerc ('Ophth. Rev.,' iii, 115).

The remarks in his paper on this subject* are drawn from its use in more than 600 cases. The remedy is indicated—

1. In contagious catarrhal ophthalmia, either as the only treatment or as a preliminary to local cauterisation.

2. In recent follicular conjunctivitis (granular disease of the lids) when the subconjunctival congestion and irritation are not very great; likewise in the later stages, without or with chronic blennorrhœa, unless the mucous membrane should present decided symptoms of relaxation.

3. In old trachomatous granulations with obstinate pannus, especially when the conjunctiva is atrophied to some extent.

4. In phlyctenular conjunctivitis when a moderate degree of irritation is accompanied by swelling of the conjunctiva.

5. In broad prominent infiltrations on the conjunctiva of the globe, threatening ulceration.

6. In torpid purulent infiltrations (of the cornea), either without previous iridectomy or after it.

As contra-indicating this means in conjunctival affections, von Graefe notes too great tension and resistance of the mucous membrane, threatening or already existing acute keratitis, and, in general, any irritation proved to be excessive, either by the appearance of the eye or by a trial of the remedy.

If the author had to characterise the therapeutical action of this remedy in respect to the eye, he would say that it is an alterative and astringent, having a very slight chemical action on the epithelial covering, a decided influence on vascularisation and secretion, opposing the development of the lymphatic follicles, and exciting a tendency to reparation in certain ulcers.

In a paper "On the Injuries to the Eyes to which Engineers and Boiler-makers are specially exposed,"† Mr. Lawson writes—"It is really distressing to witness the number of eyes which are lost yearly by some of the most intelligent of all our mechanics, and simply from the fact that they will not take the easy precaution of wearing a pair of protectors when engaged at work which jeopardises the safety of their eyes. Experience is of little use in teaching them prudence, for, having lost one eye from an accident incidental to their employment, they often return to the same work as soon as they have recovered, without using any protection for their single eye; and in several instances they have been brought to the hospital, after a lapse of time, with it also destroyed by a similar casualty.

"The boiler-makers are more liable to accidents than the engineers, and they are usually of a more severe character. In striking hot rivets, and in cutting cold ones, fragments of the metal become detached, and fly off with such violence as often to penetrate the globe, or to inflict on it an injury which is either irreparable, or else, if the eye recovers, to leave it permanently a damaged organ. I have lately had some efficient eye-protectors made by Mr. Pillischer, the optician, 88, New Bond Street, which may be purchased for the mode-

* 'Arch. für Ophth.,' x, 2, p. 191.

† 'Ophth. Hosp. Reports,' iv, 369.

rate sum of 5s. 6d. The only peculiarity about them is, that the glass front, instead of being of common glass, which is easily broken, is made of the best plate, 1-16th of an inch in thickness; the glass face is larger than in those commonly used by the men, so that the field of vision is scarcely interfered with, and the surrounding wire gauze is of the best material. They accurately cover the eye, and are maintained *in situ* by an elastic band around the head. They are efficient protectors, and would, if habitually worn by men who expose their eyes to constant danger, diminish to a very appreciable extent the number of eyes which are lost every year through the want of using this simple precaution."

Dr. Classen* relates two cases of *metamorphopsy*, which show that this aberration of vision depends on differences in the level of the retina, provided there are no irregularities in the refracting media. Such changes of position are, of course, not unfrequently caused by exudation in or under the retina. Diagnostically it may be of importance to note that the curved appearance of straight lines is in such cases one of the earliest symptoms; it disappears after a time, but only owing to the affected portion of the retina gradually losing its perceptive power. The apparent curvature corresponds to the direction in which the retina is raised; for example, the upper and left quadrant of the retina is affected when a straight line seems bent to the right and downwards. It would hence appear that the arrangement of the objects contained in the visual field, if we neglect the estimation of depth, depends on the structure of the eye and the superficial expansion of the retina, the muscles being in no way concerned. Thus, displacements of the retinal elements change the relative position of objects in the manner described; but aberrations in the muscular sense of the ocular muscles displace the whole field of vision, but never its separate constituents with reference to one another; thus, the retina, a part closely allied to the brain, would be the seat of a transformation of physical into psychical processes. The optic nerve would no longer be assigned the office of transmitting retinal images in their proper order to the brain to a so-called central retina, where at length the transformation into psychical processes would occur; its business would simply be to connect the retinal irritation with other psychical processes and sensations.†

* 'Arch. für Ophth.,' x, 2, p. 155.

† We may here quote the following articles:—J. J. C. van Woerden, the externally visible blood-vessels of the eye, both in their healthy and morbid state; a dissertation published at Utrecht in 1864. T. Leber, anatomical researches on the blood-vessels of the human eye ('Denkschr der kaiserl. Akad. der Wissensch.: Math. Naturw. Classe,' xxiv, 2, p. 297; and 'Arch. für Ophth.,' xi, 1, p. 1). A. Iwanoff, contributions to the pathological anatomy of the eye ('Arch. für Ophth.,' xi, 1, p. 135). E. Klebs and Dr. Schiess-Gemuseus, on the pathological anatomy of the eye ('Arch. für Ophth.,' xi, 1, p. 235; 'Arch. für path. Anat.,' xxxiii, p. 489). M. A. Adams, congenital absence of the eyes ('Brit. Med. Journ.,' 1865, i, 512). J. Jacobson, wound of the eye by a foreign body penetrating to near the optic nerve ('Archiv für Ophth.,' xi, 1, p. 129). R. Berlin, extraction of a foreign body from the sclera near the posterior pole ('Klin. Monatsbl. für Augenh.,' 1866, p. 81). G. Lawson, on hæmorrhage within the eye from injury ('Brit. Med. Journ.,' 1865, ii, 582, 604). Rondeau, on reflex ocular affections and on sympathetic ophthalmia, Paris, 1866. J. J. Maats, on sympathetic affections of the eye

Eyelids.—U. Herzenstein* thinks that in trichiasis the great object of treatment is to destroy the hair-bulbs without altering the form of the edge of the lid (*i. e.* to produce an artificial madarosis).

For this purpose he uses a thread-seton, passed just in front of the tarsal cartilage, $1\frac{1}{2}$ "—2" from the edge of the lid. Each day the seton is drawn backwards and forwards till sufficient suppuration is induced; it was removed on the seventh day in a case related by the author. D. Prince† has modified the ordinary operation for blepharo-phymosis by transplanting a small flap from the delicate skin of the lower eyelid to cover the wound instead of using conjuncture.‡

Muscles.—Dr. Benedikt has published his 'Electro-Therapeutical and Physiological Researches on Paralysis of the Ocular Muscles,' § in

('Donders 6e. Versl.,' p. 25, and 'Nederl. Archief voor Genees-en Natuurkunde,' ii, 1). G. Lawson, on sympathetic ophthalmia (pamph., London; and 'Ophth. Rev.,' ii, 398); and case of sympathetic disease more than seven years after the injury ('Ophth. Hosp. Rep.,' v, 42). Dr. Guepin, M. Dolbeau, and Dr. Derby, on sympathetic ophthalmia ('Ann. d'Ocul.,' liii, 232; 'L'Union Méd.,' xxxi, 20; 'Ophth. Rev.,' ii, 58). Dr. Derby, case of intermittent ophthalmia ('Trans. of the Amer. Ophth. Soc.,' 1865, p. 24). J. Hutchinson, the effects of injuries to the fifth nerve on the nutrition of the eyeball and on the sight ('Ophth. Hosp. Rep.,' v, 33); and on paralysis of the ocular branches of the cervical sympathetic nerve (*ib.*, p. 135). H. Snellen, on ophthalmia from paralysis of the fifth nerve ('Nederl. Archief voor Gen. en Natuurk.,' i, 156). J. Jacobi and R. Schirmer, on diseases of the eye in cerebro-spinal meningitis ('Arch. für Ophth.,' xi, 3, p. 156; 'Ophth. Rev.,' iii, 213). J. Mannhardt, ophthalmological cases of masked intermittent fever (*ib.*, ii, 199). H. W. Williams, puerperal inflammation of the eyeball diagnosed on the first day of the disease (*ib.*, p. 403). R. Schelske, on colour-blindness ('Arch. für Ophth.,' xi, 1, p. 171). X. Galezowski, on monocular diplopia ('Ann. d'Ocul.,' liv, p. 199). J. B. Schuurman, the movements of the eye in emmetropia and ametropia (dissertation, Utrecht). J. B. Ullersperger, the history of the operation for cataract ('Arch. für Ophth.,' xi, 2, p. 266). Sichel, on the coexistence of blindness and deafness ('Ann. d'Ocul.,' liii, p. 187). A. von Graefe, on visual vertigo ('Ophth. Rev.,' ii, 282). R. B. Carter, on the local application of hot and cold compresses in ophthalmic diseases (*ib.*, p. 126). J. Cyr, on the use of pulverised fluids ('Ann. d'Ocul.,' lv, p. 232). J. Z. Laurence, apparatus for fixing the head ('Ophth. Rev.,' ii, 76); and a new speculum (*ib.*, p. 284). A. von Graefe, on a compound lens (*ib.*, iii, 71). R. B. Carter, on a compound ophthalmoscopic object-glass ('Lancet,' 1865, i, 283). E. Javal, a sliding rule for the use of ophthalmic surgeons ('Ann. d'Ocul.,' liii, p. 181); and M. Giraud-Teulon, on the same subject (*ib.*, liv, p. 183). M. Mimocky, on the intra-ocular blood-circulation, and on diffusion ('Arch. für Ophth.,' xi, 2, p. 84). B. Rosow and E. Mandelstamm, on ophthalmometry (*ib.*, p. 129, p. 259). Giraud-Teulon, on a simplified view of the fundamental optical formula ('Ophth. Rev.,' ii, 44). Ophthalmic surgery at home and abroad (*ib.*, p. 1). Provincial eye hospitals (*ib.*, p. 319). On the necessity of a better provision for teaching ophthalmology in England (*ib.*, iii, 121). B. J. Jeffries, report on the progress of ophthalmology in the year 1864 (*ib.*, ii, 386).

* 'Arch. für Ophth.,' xii, 1, p. 76.

† 'Amer. Journal of the Med. Sciences,' lii, p. 381.

‡ See also P. E. G. Cruveilhier's essay on entropium, Paris, 1866. O. Becker, case of congenital coloboma of the eyelid ('Ophth. Rev.,' iii, 74). M. Warlomont, on chro-midrosis (*ib.*, ii, 179). E. P. Wright, violent inflammation of the eyelids produced by arnica ('Dubl. Med. Press,' x, 528). C. Mauvezin, gangrenous œdema ('Arch. Gén. de Méd.,' 1865, i, 421). G. Lawson and J. Windsor, syphilitic sores on the eyelids ('Lancet,' 1865, i, 478; 'Brit. Med. Journal,' 1865, i, 558). Mr. Porter, case of rodent ulcer ('Med. Press and Circ.,' ii, 9). A. von Graefe, on operations for entropium and entropium ('Arch. für Ophth.,' x, 2, p. 221). F. A. Hlamer, on the operation for blepharo-phymosis ('Ned. Arch. v. Genees. en Natuurk.,' 1865, p. 135).

§ 'Ophth. Rev.,' ii, 143.

which he states that the cure was dependent, generally speaking, upon reflex excitation through the 5th pair of nerves, and not upon direct excitation of the nerves supplying the muscles themselves; in most cases a curative action was produced only when the excitation was relatively weak, and when no trace of muscular contraction was produced by the electricity. The intensity of the current should be such as to produce slight sensation in the parts excited, and the excitation should only be continued for about half a minute at each sitting. Dr. Benedikt usually excites for a few seconds, then tests for improvement, and then excites again, until he observes that the improvement ceases to make progress. The improvement takes place instantaneously in most cases. When the paralysis has been unaffected by 14 days of treatment, he has, as yet, seen no benefit from its longer continuance. He always employs the constant current. He has succeeded in curing, or in greatly improving, many cases in which vesicants, strychnia, secale cornutum, vapour baths, and section of the antagonistic muscles, had been applied without result; and he has not hitherto met with a single case that resisted electricity in which these remedies have afterwards effected a cure.

Prof. Szokalski has followed a somewhat different plan, with great apparent success, in 4 cases of paresis of the third nerve.* He commences the treatment with Faradisation and closure of the healthy eye. At first weak streams are applied once a day, and continued for not more than three to five minutes; then stronger currents are gradually employed, and continued for a longer time; at a later period still, the applications are made twice a day. For the purpose of transmitting the electric current directly to the muscles, he employs the common silver elevators, partially insulated. The treatment is concluded by systematic exercise; better results are gained when the antagonistic action of the muscle is called into play than when contraction is directly excited by the will. By antagonistic action of the ocular muscles the author means the gradual contraction which takes place for the purpose of keeping an object in view when the head or whole trunk is moved away.

R. Liebreich† has found that the conjunctiva is firmly connected with the capsule of Tenon for some distance from the edge of the cornea, and that by dividing this adhesion a strabismus amounting to 3''' in adults, or 4''' in children, may be corrected by one tenotomy. He describes his modification of the operation for squint thus:—"If the internal rectus is to be divided, I raise with a pair of forceps a fold of conjunctiva at the lower edge of the insertion of the muscle; and, incising this with scissors, enter the points of the latter at the opening between the conjunctiva and the capsule of Tenon; then carefully separate these two tissues from each other as far as the semilunar fold, also separating the latter, as well as the caruncle from the parts lying behind. When the portion of the capsule which is of such importance in the tenotomy has been completely separated from the conjunctiva, I divide the insertion of the tendon from the sclerotic in the usual

* 'Ophth. Rev.,' iii, 80.

† 'Brit. Med. Journal,' 1866, ii, 653.

manner and extend the vertical cut, which is made simultaneously with the tenotomy, upwards and downwards—the more so if a very considerable effect is desired. The wound in the conjunctiva is then closed with a suture. The same mode of operating is pursued in dividing the external rectus; and the separation of the conjunctiva is to be continued as far as that portion of the external angle which is drawn sharply back when the eye is turned outwards.* The advantages claimed are that it gives the operator greater scope, that there is no sinking of the caruncle, that the conjunctiva reassumes its original position, and that not more than two operations are ever required.

M. Landsberg has described 12 cases of *muscular asthenopia*, in which the constant current gave wonderful results.* M. Javal† has pointed out the great value of the stereoscope in the treatment of squint.‡

Orbit and Exophthalmus.—According to von Graefe,§ a symptom of pathognomonic importance in the earlier periods and slighter degrees of exophthalmic goitre is furnished by the defective co-ordination between the movements of the eyelid and the elevation or depression of the eyes. When a healthy person looks upwards or downwards the upper lid moves in a corresponding direction, whilst in those affected with the disease the lid moves only very slightly, or not at all; this is especially noticeable when the patient looks down. This symptom is not due to the exophthalmus, but apparently to some alteration in the innervation of the muscles of the lid. Cases are not very rare where the only symptoms of this affection in women are rapid action of the heart without hypertrophy or valvular disease, and defective mobility of the lid.

Mr. Nunneley, commenting on some cases of vascular protrusion of the eyeball,|| states that in his opinion “in the great majority of such cases of protrusion of the eyeball there is no disease whatever in the orbit; the state of it is most commonly intra-cranial. The protrusion of the eyeball is passive, and the other distressing symptoms are secondary, depending upon obstruction to the return of the blood through the ophthalmic vein, just as happens in those cases of popliteal and axillary aneurisms where the limb swells below the tumour, because this presses upon the accompanying vein. That this pressure, in the great majority of acute spontaneous cases, is caused by an aneurism of the carotid as it emerges into the cranium, or of the ophthalmic artery

* ‘Arch. für Ophth.’ xi, 1, p. 69.

† ‘Ophth. Rev.’ ii, 182, 190.

‡ See also L. Kugel, case of insufficiency of both the external and internal recti (‘Arch. für Ophth.’ xii, 1, p. 66). Alf. Graefe, on binocular vision in strabismus (ib., xi, 2, p. 1). J. V. Solomon, the radical cure of extreme divergent strabismus (Lond. 1864). T. Windsor, case of operation for paralytic strabismus (‘Ophth. Rev.’ ii, 162), and cases of strabismus, reported by Dr. Little (ib., iii, 148). Dr. Steffan, on the estimation of the amount of deviation of a squinting eye (ib., ii, p. 331), and on the operation for hyperopic convergent strabismus (ib., p. 335). E. Javal, new mode of choosing a prism for a case of strabismus (ib., iii, 85), and on suppression of one retinal image (ib., p. 88; ‘Ann. d’Ocul.’ liv, p. 5).

§ ‘Ophth. Rev.’ ii, 277.

|| ‘Med.-Chir. Trans.’ xlviii, p. 15.

near to its origin, is, I think, now certainly proved. In cases of traumatic origin, supervening soon after severe injury to the head, the cause is most probably effused blood near to or within the cavernous sinus, while in those cases where the protrusion does not come on until some time after the receipt of the injury, or where the violence has not been so considerable, it may be serum, or fibrine, or even pus, the result of suppuration in the sinus." Where the protrusion takes place more slowly and is unaccompanied by the acute symptoms usually resulting from aneurismal pressure, we may suspect the cause to be some growth in or near the cavernous sinus, or some tumour or effusion within the orbit and near its apex, rather than aneurism, whether true or false. Mr. Nunneley believes that "in a less intense degree and more chronic condition protrusion of the eyeball resulting from posterior venous congestion is by no means uncommon. Whatever obstructs the return of blood may indirectly, if not directly, induce fullness of the eyeball. Tumours of every kind in the orbit, cranium, or neck, may be all causes." The author quotes as examples exophthalmic goitre, the prominence of the eye not unfrequently seen in heart disease, emphysema, chronic bronchitis, and confirmed asthma.*

Lachrymal apparatus.—Mr. Laurence has re-introduced removal of the lachrymal gland as a radical cure for lachrymal disease;† he has removed nine glands, and considers this operation applicable to those cases of inveterate fistula which other methods have failed to cure.‡

* See also S. Watson, on abscess and tumours of the orbit, London, 1866. II. Küchler, on orbital tumours ('Deutsche Klinik,' 1866, p. 157, &c.). R. M. Hodges, cavernous tumour, ('Ophth. Rev.,' ii, 276). J. Z. Laurence, melanotic tumour (ib., iii, 79). P. H. Macgillivray, hydatids in the orbit (ib., 73). A. Rothmund, bullet lodged in the orbit, eye uninjured ('Klin. Mon. f. Augenh.,' 1866, p. 110). Szokalski, T. G. Morton, and C. Freeman, cases of intra-orbital aneurism ('Ophth. Rev.,' ii, 188; ib., p. 198; 'Amer. Journ. of the Med. Sciences, lii, p. 277).

Dr. Gros, W. Moore, and Prof. Traube, on exophthalmic goitre ('Gaz. Hebd. de Méd.,' 1864, p. 825; 'Dubl. Quart. Journ. of Med. Science,' xi, p. 344; 'Ophth. Rev.,' ii, 283). H. R. de Ricci, exophthalmus caused by a varicose tumour of the orbit ('Dubl. Quart. Journ.,' xi, p. 344). J. Schiffer and O. Wyss, exophthalmus from a melanotic sarcoma of the sphenoid ('Arch. für path. Anat.,' xxxv, p. 413). J. v. Kempf and J. Laurence, cases of periodical exophthalmus ('Allg. Wiener Med. Zeit.,' 1864, p. 131; 'Ophth. Rev.,' ii, 382). S. D. Gross, exophthalmus from an accumulation of orbital fat ('Ophth. Rev.,' ii, 67). R. M. Hodges, exophthalmus due to an exostosis (ib., p. 217). X. Galezowski, case of exophthalmus and neuro-retinitis caused by an orbital cyst ('Ann. d'Ocul.,' liii, p. 202). H. Cohn, an instrument for measuring the prominence of the eye ('Klin. Mon. f. Augenh.,' 1866, p. 157).

† 'Ophth. Rev.,' iii, 138.

‡ See also Dr. Wecker, case of dacryops ('Gaz. Hebd. de Méd.,' 1866, p. 390). F. Horner, inflammation of both lachrymal glands ('Klin. Mon. f. Augenh.,' 1866, p. 259). E. Jäsche, on obstructions in the nasal duct ('Auch. für Ophth.,' x, 2, p. 166). N. Manfredi, on the radical cure of tumour and fistula of the lachrymal sac ('Ophth. Rev.,' ii, 418). T. Windsor, cases of obliteration of the lachrymal sac, reported by Dr. Little (ib., iii, 54).

Intra-ocular Tumours.—Dr. Schiess-Gemuseus ('Arch. für Ophth.,' x, 2, p. 109). M. Landsberg (ib., xi, 1, p. 58). M. Gruber ('Deutsche Klinik,' 1866, p. 150). X. Galezowski ('Gaz. des Hôp.,' 1866, p. 274). F. Busch ('Arch. f. Path. Anat.,' xxxvi, p. 448). J. Jacobson, cysticerci in the eye ('Arch. f. Ophth.,' xi, 2, p. 147). U. Coste, essay on cancer of the eye, Montpellier, 1866. Prof. v. Hasner, on cancer of the eye and of its appendages ('Ophth. Rev.,' ii, 254). R. Schirmer, J. Z. Laurence, J. Hutchinson, cases of intra-ocular cancer (ib., pp. 213, 273, 378; 'Ophth. Hosp. Rep.,' v, 88).

Conjunctiva.—Dr. Prosoroff has published a series of experiments on rabbits as to the action of various medicaments on the conjunctiva of the lid.* He found that 5-grain solutions of nitrate of silver, bichloride of mercury, sulphates of copper and zinc, tannin, acetate and basic acetate of lead, induce the formation of pus-corpuscles; that the action of red precipitate (in ointment, 5 gr. to the ounce of lard) is not uniform; and that nitrate of potash, alum, and carbonate of potash, cause cell-division and the development of free nuclei. The action of all these means is therefore irritant. He gives the following table of the relative intensity of action of the same solutions, *i.e.* the number of hours for which a single application acted.

<i>a. Medicaments causing the formation of pus-corpuscles:</i>		
Bichloride of mercury	—	144
Nitrate of silver	50	52
Tannin	12	14
Basic acetate of lead	11	14
Sulphate of zinc	10	11
Sulphate of copper	9	11
Acetate of lead	8	9
<i>b. Medicaments causing the formation of free nuclei:</i>		
Nitrate of potash	3½	5
Alum	3½	5
Carbonate of potash	1	2

The author's next step was to determine for how long a time the same substance in various degrees of concentration would act. The author's conclusion is that, as all the means hitherto mentioned exercise only an irritant action, it is quite immaterial which is employed in any particular disease of the eyelid; they all act in the same way provided an adequate quantity is used, and this quantity may be easily determined by a geometrical proportion from the table in which the different medicaments are arranged according to their effects. Thus, a 1-gr. solution of Arg. Nitr. acts for 10 hours, a 5-gr. solution for 50 hours; the latter corresponds, in respect to the time at which pus ceases to be formed or in respect to the degree of irritation, to the following solutions:

Tannin	18½	gr. to the ounce of water.
Bichloride	13½	" " "
Cupr. Sulph.	23½	" " "
Zinc. Sulph.	26	" " "
Plumb. Ac. Basic. ...	18½	" " "
" " " ...	28½	" " "
Mercurius præc. rub.	37½	" " lard.

The author relates a series of experiments in respect to the solid nitrate of silver and sulphate of copper.†

* 'Arch. für Ophth.,' xi, 3, p. 142.

† See also A. v. Graefe, on contagious ophthalmia ('Ophth. Rev.,' ii, 215). Mooren, on the treatment of conjunctival affections (ib., p. 309). H. Hancock, on catarrhal ophthalmia ('Brit. Med. Journ.,' 1865, i, 633). Dr. Czelechowsky, Wolff, W. Stokes, and M. Serres, on granular disease ('Ophth. Rev.,' ii, 53; ib., iii, 93; 'Dubl. Quart. Journ.,' xli, p. 38; 'Ann. d'Ocul.,' lvi, p. 78). R. Berlin, moist warmth in diphtheritic

Cornea.—A. Rothmund has introduced the use of subconjunctival injections in cases of corneal opacity.* Wood's syringe, with its point somewhat curved, is introduced between the conjunctiva and sclera $1\frac{1}{2}'''-2'''$ from the edge of the cornea, and the fluid is slowly pressed out. In 6 cases of parenchymatous keratitis the author used a solution of common salt, ʒj—3j to the ounce of water being the best proportion; the fluid should be somewhat warmed before being injected. The consequent symptoms of irritation disappear in 5 or 6 days. The author has repeated the injection at intervals of 3 or 4 weeks. A comparative experiment was made in one case where both corneæ were entirely opaque; one eye was treated by subconjunctival injections, the other by the usual irritants; the former cleared decidedly the more rapidly.

Dr. Pagenstecher has strongly recommended the ointments of the yellow amorphous oxide of mercury in phlyctenular disease.† The modification of paracentesis introduced by C. Sperino‡ has rendered the operation much safer and more effective; it consists essentially in the division of the operation into 2 parts, incision and evacuation; the narrow knife being withdrawn, the discharge of the aqueous humour is effected by means of a blunt probe, of metal or whalebone, which is carried more or less deeply into the anterior chamber, and then pressed lightly backwards.

Prof. Hasner§ records a case of deep keratitis which rapidly improved after paracentesis corneæ; and J. Hutchinson|| one of intense photophobia from acute corneitis in a patient perfectly blind owing to white atrophy of the optic nerves.¶

Iris.—Alfred Graefe has recorded a case under the title of *membrana pupillaris perseverans* and polycoria,** in which an adventitious membrane with 8 holes or fissures was found in front of the iris, to which, however, it did not adhere; no trace of mobility could be discovered in it; the iris was normal both in structure and action. He considers the membrane to be the remains of the anterior part of the vascular capsule of the lens.

The simple and elegant operation of iridodesis has proved to be attended by risk of ulterior inflammation of a formidable character.††

Lens.—During the last two years Messrs. Critchett and Bowman have improved and practised on an extensive scale the scoop-operation;

conjunctivitis ('Ophth. Rev.' ii, 74). J. S. Hildreth, on the treatment of purulent ophthalmia ('Trans. of the Amer. Ophth. Society,' 1865, p. 12).

Sclera.—O. D. Pomeroy, wound sutured ('Ophth. Rev.' iii, 80). G. Lawson and P. Schröter, on rupture ('Med. Times and Gaz.,' 1865, i, 570, 596; 'Klin. Mon. f. Augenh.,' 1866, p. 242). G. Nicola and V. Achille, staphyloma treated by ligature ('Ann. d'Ocul.,' lv, p. 101).

* 'Klin. Mon. f. Augenh.,' 1866, p. 161.

† 'Ophth. Rev.' ii, 115.

‡ Ib., ii, 294.

§ Ib., ii, 283.

|| 'Lond. Hosp. Rep.,' iii, 393.

¶ See also T. Windsor, cases of staphyloma treated by ligature, reported by Dr. Little ('Ophth. Rev.' iii, 58). M. Giraud-Teulon, on the local use of calomel in superficial diseases of the cornea ('Ann. d'Ocul.,' liv, p. 257). Dr. Magni, sarcoma on the cornea ('Ophth. Rev.' iii, 90). Dr. Schiess-Gemuseus, on the pathological anatomy of anterior staphyloma ('Arch. für Ophth.,' xi, 2, 47).

** 'Arch. für Ophth.,' xi, 1, p. 209. See also G. Sous, cases of congenital defects of the iris ('Ann. d'Ocul.,' liii, p. 244).

†† Cases of irido-choroiditis after iridodesis, recorded by M. Gruber and Dr. Höring

Prof. von Graefe has introduced a modified linear extraction applicable to all forms of cataract; Prof. Pagenstecher and Dr. Wecker have called attention again to extraction of both lens and capsule at the same time; and numerous oculists have published contributions of greater or less importance on this subject.

There are two points which specially distinguish the Moorfields operation from former processes—a larger incision, and improved form of the scoop. In Mr. Critchett's operation* chloroform is usually administered, the lids are fully separated by a wire speculum, and the eye is firmly fixed by forceps; the incision is made with a lance-shaped knife, and enlarged when necessary with the scissors; it is slightly curved, its centre being in the upper part of the cornea about half a line from the sclera, and its extreme limits trenching slightly upon the junction of the sclerotic with the cornea in cases of hard senile cataract, though its extent may be more limited when the nucleus only is hard. A small piece of iris is then removed, the capsule is opened, and the lens is removed by the scoop. Mr. Bowman's plan† hardly differs except in the incision; he introduces the lancet-shaped knife at the extreme margin of the anterior chamber, and pushes it on with its flat parallel to the iris until its point reaches the opposite rim, thus making a curvilinear wound in the corneo-sclerotic junction. A review of more than 130 unselected cases gave Mr. Bowman the following results:

"1. The first class are those in which the power of reading a small type (viz., up to No. 6 of Jäger) has been obtained. Several of these have been able to see No. 1, and many Nos. 3 and 4, but all have been able to read No. 6. The average number reaching this degree of success has been 68 per cent.; or taking only cases treated in private, they have been 75 per cent., or three fourths of the whole. Of these last, 55·8 per cent. have not required any secondary operation, 19·2 have attained the result only after a needle operation on the pupil.

"2. The second class comprises cases in which the power of seeing a type ranging between 6 and 14 of Jäger has been gained, which might be termed very useful sight for all ordinary purposes. The number of these cases has been in all 14·5 per cent. Of this class the cases treated in private, if separately enumerated, rise only to 13·4 per cent., a greater number having probably been raised by secondary operation out of the second into the first class in private than in hospital practice.

(*'Deutsche Klinik,'* 1866, p. 149; *'Ophth. Rev.,'* ii, 208). See also G. Lawson, on the treatment of prolapse of the iris (*'Ophth. Hosp. Rep.,'* iv, 227). T. P. Teale, on the relative value of atropine and of mercury in the treatment of acute iritis (*ib.*, v, 156). J. Bell, on certain forms of dilated pupil (*'Edin. Med. Journ.,'* x, 917). A. Eulenburg, case of spastic mydriasis (*'Ophth. Rev.,'* ii, 210). F. Fieber, on the electrical treatment of toxic paralytic mydriasis (*ib.*, p. 411). R. Schirmer, tumour, and M. Fano, cancer, of the iris (*ib.*, p. 213; *'Ann. d'Ocul.,'* liv, p. 240). H. Snellen, on the division of recent anterior synechia (*'Ned. Arch. v. Genees. en Natuurk.,'* ii, 214). Dr. Krüger, new instrument for use in iridodesis (*'Ophth. Rev.,'* ii, 280). Heymann, on injection of a solution of common salt in hæmorrhage after iridectomy (*ib.*, p. 51).

* *'Ophth. Hosp. Rep.,'* iv, 315.

† *ib.*, p. 332.

"3. The third class comprises such a very limited result as allowed of the patients having fair perception of light, of colours, of large objects, of fingers held a foot off, and of seeing their way about in an accustomed place—only some slight improvement, in fact, of their previous condition of complete cataract. These are in all 9 per cent., or of the hospital cases 11·4 per cent., and of private cases 5·77 per cent.

"4. The fourth class are lost eyes; either bare perception of light, or none. These are (all included) 8·4 per cent., or of hospital cases 10·1 per cent., of private patients 5·77 per cent."

Prof. von Graefe performed this operation on 118 eyes;* of these, 7 were completely lost from panophthalmitis or irido-cyclitis; 4 were nearly lost; and in the remaining 107 eyes the necessity for secondary operations, iridectomy or division of capsular remains, was apparent in 28 or 30 cases, if the patients were to regain the faculty of reading a small type with fluency. Among the whole number of 118 there were 19 cases in which anomalies occurred in the course of the operation,—prolapse of the vitreous (11 times), unusually difficult removal of cortical masses, or the necessity of leaving them behind. Of these 19 cases 4 are among the 7 which were lost, and 2 among the 4 "nearly lost" eyes; excluding these cases, we find that, even after normally performed operations, there were about 4 cent. of failures.†

Prof. v. Graefe's operation.‡—The lids are separated by a speculum, and the eyeball is drawn down by forceps placed immediately below the cornea. Chloroform is rarely used. The point of a small knife, of which the edge is directed upwards, is inserted at a point A § near the upper part of the cornea, so as to enter the anterior chamber as peripherally as possible. The point should not be directed at first towards the spot for counter-puncture; not till the knife has advanced fully three and a half lines within the visible portion of the anterior chamber, should the handle be lowered, and the point directed to B. As soon as the resist-

* 'Ophth. Rev.,' iii, 11.

† It is well to compare these results with those of flap-extraction. Von Graefe (l. c., p. 12) states that, "among 1600 extractions performed in the course of 11 years, 7 per cent. were failures. Under this term I comprehend not only eyes which were lost, but those also which had not retained qualitative vision, or did not offer any chance for a successful after-operation. Imperfect results, implying incapacity of reading common print, I obtained in 13 per cent. Of these, 3 per cent. presented incurable complications, whilst 10 per cent. afforded hope for their being raised by after-operation to the rank of satisfactory results. In 80 per cent. of the cases I obtained perfect results by one operation. More favorable than this grand total of the results of my practice is that since the introduction of the compress bandage. During this latter period I find that, of the 900 eyes operated on, there were 5 per cent. failures, 11 per cent. incomplete, and 84 per cent. perfect results. In the private rooms my operations were generally more successful than in the hospital, a fact which may partly be accounted for by the better air, partly by the better constitutions in the former instance. Thus, among the private patients of these last 6 years (250 eyes), I had 91 per cent. perfect, 6 per cent. imperfect results, and 3 per cent. failures. Correspondingly, the proportions in the hospital cases are more unfavorable than the above-stated average."

‡ 'Ophth. Rev.,' iii, 7; 'Arch. für Ophth.,' xii, 1.

§ The point A should be fully $\frac{3}{8}$ " from the margin of the cornea, and as much below the tangent at its vertex; with such a puncture, and a symmetrical counter-puncture in B, the external wound attains a length of $4\frac{1}{2}$ or 5 lines.

ance to the point is felt to be overcome, showing that the counter-puncture is effected, the knife must be at once turned forwards, so that its back is directed almost to the centre of the ideal sphere of the cornea, whether the conjunctiva is transfixed or not, and the scleral border is divided by boldly pushing the knife onwards and again drawing it backwards. This portion of the operation is concluded by the formation of a conjunctival flap a line and a half or two lines in length. A section thus made is almost perpendicular to the cornea, a circumstance much facilitating the passage of the lens, and the line of incision is nearly straight, so that the wound does not gape. The iris should be excised to the very end of the wound, and the capsule should be most freely opened by a V-shaped laceration. Any lens, even the hardest, may then be removed without the introduction of an instrument into the eye, but von Graefe's experience shows it to be advisable to assist the evacuation by the hook in about 1 case in 8. In a certain number of cases the lens will escape without difficulty when the operator presses on the posterior lip of the wound, especially when the back of the spoon is made to glide along the sclera; should this not occur, von Graefe uses a peculiar blunt hook, or occasionally, though rarely, a spoon. A compressing bandage is applied and replaced at intervals.

The results in about 300 operations were—that in 90 per cent. the success was complete, S being from $\frac{1}{6}$ to $\frac{5}{6}$; the convalescence was in 82 per cent. perfectly normal, in 8 per cent. accompanied by temporary accidents, irritations of the wound, the iris, or capsular cells, small prolapses of the iris near the ends of the incision, and slight opacities of the vitreous which retrograded at a later period; that in 10 per cent. the vision was imperfect. This amount must, however, be divided into failures and partial successes, the majority of the cases belonging to the latter category, and most of them giving reason to hope for complete success from further operations; thus, till the result of such secondary operations is decided, we may estimate the final result at 94 per cent. of complete successes (S being greater than $\frac{1}{6}$), a result much superior to that obtained by von Graefe from flap extraction.

Dr. Pagenstecher* considers that, so far as the operation is concerned, the dangers of extraction depend principally on primary corneal sup-puration or iritis, the former being due to the position of the incision, the latter to the irritation arising from the retracting capsule, from swollen cortical remnants, or from changes in the intracapsular cells. He thinks the former danger may be entirely avoided by the location of the incision in the sclera (much as in Jacobson's mode), and the latter by removing both the capsule and the lens. The opinion that primary iritis after the operation is almost invariably produced in the way just mentioned, has recently gained many adherents; and if such be admitted, it is clear that the only certain mode of preventing it must be the removal of the unopened capsule.

* "On Extraction of Cataract by the Scleral Incision without opening the Capsule." A paper read at Frankfurt a. M., April 3, 1866. Pamphlet of 37 pp. (See also 'Ophth. Review,' iii, 68, and 'Klin. Beobacht. aus der Augenheilanstalt zu Wiesbaden,' 38. Heft, p. 10.)

In this operation the patient must be *completely* under the influence of chloroform, and show no sign of reaction when the conjunctiva is seized by forceps. The scleral incision is made downwards, the knife being introduced a little below the horizontal meridian of the globe, about $\frac{3}{4}$ ''' from the outer edge of the cornea, and passed through the anterior chamber just in front of the iris, so as to emerge at the corresponding point on the inner side. The incision through the sclera is then completed, a small bridge of conjunctiva being left. The iris is freely excised downwards and outwards, after which the conjunctival bridge is divided. An attempt is then made to extract the lens by gentle pressure on the upper part of the cornea. Should this fail, Dr. Pagenstecher opens the hyaloid membrane where it projects into the wound (generally with the edge of the lens), by means of a little silver hook to such an extent that he can introduce the spoon without difficulty. The latter* is passed so as to include the whole lens in its concavity. All this invariably takes place without the least loss of vitreous, provided the patient is perfectly narcotised. The after-treatment is just the same as after other modes of operating.

Pagenstecher has successfully performed his operation 63 times; in 13 further cases the capsule was accidentally opened, and some portions of it remained in the eye. Restricting ourselves to the 63 successful cases, we note that primary iritis did not occur in a single example; primary inflammation of the vitreous was observed 4 times, a yellowish opacity forming in the superficial layers of the vitreous near the wound, unaccompanied by any symptoms of iritis or cyclitis. In two cases this process extended to the rest of the vitreous, and the eyes were lost.

As to vision, 11 cases must be excluded owing to complications, such as old irido-choroiditis and glaucoma.† There remain 52 cases; of these, 19 were tested after Snellen's method,—6 times $S = 1$, *i. e.* the patient could read No. 20 at 20' by means of a proper convex glass, a result never previously attained, so far as Dr. Pagenstecher knows; twice $S = \frac{5}{7}$, once $S = \frac{4}{7}$, twice $\frac{3}{5}$, once $\frac{1}{3}$, twice $\frac{2}{7}$, once $\frac{1}{4}$, once $\frac{1}{6}$, once $\frac{1}{7}$, twice $\frac{1}{12}$.

All the cases were tested by Jäger's type:—

No. 1 was read 20 times.

" 2	"	9	"
" 5	"	12	"
" 8	"	2	"
" 16	"	3	"

That the vision was satisfactory in those who could not read was proved by counting fingers.

" 20'	"	4	"
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50

Only 2 eyes did not recover vision. These were both cases of sup-

* Made by Gück in Heidelberg and Luer in Paris. Pagenstecher generally uses one 9 mm. long, 6 mm. broad, and 1 mm. deep at the centre of the concavity.

† The results were, however, satisfactory; twice fingers could be counted to 4', once to 10—12', by a patient who did not know how to read; and all the rest could make out No. 12—15 Jäger.

puration of the vitreous; one of them still had quantitative perception of light. In neither had any vitreous been lost; in one, in which the inflammation did not commence till the 15th day, the hyaloid fossa had not even been ruptured.

It must be remarked that these statements give the power of vision that directly resulted from the operation, for in not a single case was a secondary operation required. In 7 of the cases the other eye had been lost after a previous cataract operation (3 by reclinatio, 4 by flap-extraction which had been followed by iritis). Pagenstecher has treated all his cases of hard cataract in this way during the last 18 months.*

* *Lens*.—W. Bowman, cases of malformed, misplaced, and dislocated lenses, in some of which glaucomatous symptoms were developed ('Ophth. Hosp. Rep.,' v, 1). A. Moers, experimental researches on inflammation and suppuration of the lens ('Arch. für path. Anat.,' xxxii, p. 45). C. Pagenstecher, on injuries of the lens ('Ophth. Rev.,' ii, 191). X. Galezowski and J. Szokalski, subconjunctival luxation ('Ann. d' Oc.,' liii, p. 196; ib., liv, p. 212). Von Graefe, case of cysticercus within the lens ('Deutsche Klin.,' 1865, p. 115). J. S. Wells, lectures on cataract ('Med. Times and Gaz.,' 1866, ii, 439, &c.). Von Graefe, on traumatic cataract ('Ophth. Rev.,' ii, 137). S. Davidsen, on zonular cataract (ib., p. 406). M. Singer, A. Samelson, and C. Schweigger, cases of pyramidal cataract (ib., p. 409; 'Ophth. Hosp. Rep.,' v, 48). T. Windsor and Mr. Hulme, cases of black cataract ('Ophth. Rev.,' ii, 411; iii, 84). Dr. Knapp, on the treatment of cataract (ib., ii, 71). C. R. Agnew, on operation for secondary cataract (ib. iii, 69). T. P. Teale, extraction of soft cataract by suction ('Brit. Med. Journ.,' 1865, i, 301). A. v. Graefe, on opening the capsule as preliminary to extraction ('Arch. für Ophth.,' x, 2, p. 209). Dr. Mannhardt, on the extraction of immature cataracts ('Ophth. Rev.,' ii, 185). P. J. Jacobson, on flap-extraction (ib., p. 46; 'Arch. f. Ophth.,' x, 2, p. 78; xi, 1, p. 114; xi, 2, p. 166). T. Windsor, cases of flap-extraction under chloroform, reported by Dr. Little ('Ophth. Rev.,' ii, 365). G. Braun, on the treatment of hard cataract ('Arch. f. Ophth.,' xi, 1, p. 200). L. Wecker, on extraction without opening the capsule ('Gaz. Hebd. de Méd.,' 1865, p. 467). H. Küchler, on extraction of nuclear cataract ('Deutsche Klin.,' 1866, p. 332, &c.); and on the after-treatment (ib., 1865, p. 390, &c.). J. V. Solomon, case of extraction through the sclera ('Ophth. Rev.,' ii, 28). V. Hasner, on puncture of the vitreous in extraction (ib., p. 407). G. Lawson, case of hæmorrhage after extraction ('Ophth. Hosp. Rep.,' iv, 379). X. Galezowski, on the loss of vitreous during extraction ('Ann. d' Oc.,' liii, p. 198). M. Warlomont, case of delirium after extraction (ib., liv, p. 254). Dr. Mackenzie, on cataract-glasses ('Ophth. Rev.,' ii, 223).

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A. von Graefe ('Ophth. Rev.,' ii, 51), Dr. Heymann (ib., p. 75), H. Derby (ib., p. 278), H. Jackson ('Med. Times and Gaz.,' 1865, i, 626; 'Ophth. Rev.,' iii, 42; 'Ophth. Hosp. Rep.,' iv, 389, &c.), W. Wagner ('Ophth. Rev.,' ii, p. 404), M. Bouchut ('Gaz. des Hôp.,' 1866, 353), Dr. Blessig ('St. Petersb. Med. Zeitschr.,' x), K. Fischer ('Klin. Mon. f. Augenh.,' 1866, p. 164), M. Gruber ('Deutsche Klin.,' 1866, p. 150), J. W. Hulke ('Ophth. Hosp. Rep.,' v, 16), and J. Hutchinson (ib., pp. 94, 163). Cases of retinitis pigmentosa—J. Z. Laurence ('Ophth. Rev.,' ii, 32), Dr. Höring (ib., pp. 57, 408), and Dr. Pedraglia (ib., p. 215). P. A. van der Laan, on impairments of vision in albuminuria ('Donders' zesde Verslag,' p. 161). J. Z. Laurence, on certain functional diseases of the retina ('Brit. Med. Journ.,' 1865, i, 634). Discussion on Nagel's peculiar disease ('Ophth. Rev.,' ii, 180). Prof. Manz, dropsy of the optic nerve (ib., iii, 214). J. L. Clarke and J. H. Jackson, case of white atrophy ('Lancet,' 1865, i, 617). M. Dolbeau, on atrophy of the optic nerve ('Gaz. des Hôp.,' 1866, p. 189). J. H. Jackson, on tobacco-smoking in diseases of the nervous system, and the form of amaurosis complicating locomotion ataxy ('Med. Times and Gaz.,' 1866, ii, 219). C. Gaine, anæmia of the optic nerve following abscess of the antrum ('Brit. Med. Journ.,' 1865, ii, 683). P. J. Jacobson, tumours in the optic nerve, &c. ('Arch. f. Ophth.,' x, 2, p. 55). W. Koster, on the relation of cerebral tumours to affections of the optic nerve ('Med. Press and Circ.,' 1866, i, 655, &c.). P. Steffan, Dr. Sämisch, and Dr. Quaglino, on embolism ('Arch. f. Ophth.,' xii, 1, p. 34; 'Klin. Mon. f. Augenh.,' 1866, pp. 32, 37; 'Ophth. Rev.,' iii, 1). G. Sous, aneurism of the art. centr. ret. ('Ann. d'Oc.,' liii, p. 241). H. Walton, L. Hirschmann, P. Steffan, and R. Berlin, on separation of the retina ('Med. Tim. and Gaz.,' 1866, ii, 311; 'Klin. Mon. f. Augenh.,' 1866, p. 229; ib., p. 75; ib., p. 78).

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R E P O R T
ON
MIDWIFERY AND THE DISEASES OF WOMEN
AND CHILDREN.

BY
R. BARNES, M.D., F.R.C.P.

I. GYNÆCOLOGY, EMBRACING THE PHYSIOLOGY AND PATHOLOGY OF THE
NON-PREGNANT STATE.

Menstruation.—The Ovaries.

THE normal state of the uterus and ovaries during menstruation is well shown in a case by Dr. Graily Hewitt ('Obstet. Trans.,' viii, 1867).

Dr. Allbutt relates the following case of *premature menstruation* ('Med.-Chir. Trans.,' 1866):—M. A. W.—was seen in the summer of 1865, and was reported to have menstruated within the last few days. Her age was one year and six months. The child was then suffering from emaciation, weakness, quick pulse, and other symptoms of hectic fever. These symptoms passed off in a few days, and the child partially recovered her health. On examination the anal and genital regions were found free from discharge, and quite healthy in appearance. On the following month the discharge again appeared, and after it had passed away the author found the child as before—in a state of hectic, and still presenting a perfectly healthy appearance about the anus and pudenda. He was unfortunately unable, being absent from home for a while, to see the child during the continuance of the flow. In about a fortnight the child had again recovered some degree of health. On many occasions the author carefully examined the child for disease in other organs, but did not find anything of importance. At the third monthly period he actually saw the child in a menstruating state. The discharge appeared with curious accuracy at the month, and lasted about two days and a half. The discharge was sanguineous, and in every way resembled that of a girl at puberty, but was more scanty in quantity.

A return of the hectic fever followed, and the child's life was endangered. She recovered, but only to be again prostrated by a fourth appearance; and after a fifth she died, wasted and exhausted, without any effort to rally. There were no other signs of premature puberty. A post-mortem examination could not be obtained.

Among many cases of premature menstruation on record, there are two in which the menses appeared at the age of nine months, and one in which the discharge appeared at the age of two years. The first two cases are reported in the 'Transactions of the Royal Med. and Chir. Society,' ii, 1811, p. 116, and in the 'Lancet' for November, 1828, p. 264, from Meckel's 'Archiv.' The former case was seen by Dr. Martin Wall. The third case is reported by Mr. Embling, in 'Lancet,' 1848, i, p. 137. In these three cases obvious signs of puberty were seen in the genital organs, the mammæ, and elsewhere; and these signs form a great part of the interest of the cases.

In other cases of premature menstruation exhaustion and death have occurred, as in this.

M. Ramon de la Sagra relates ('Gaz. Méd. de Paris,' 1865) the following case of a negro child, who at birth was observed to have the breasts much developed, and in whom, a few months later, a sanguineous discharge from the genital organs took place, and, in the second year, recurred at regular monthly intervals. When M. Ramon de la Sagra saw her, at the age of 32 months, she had passed through dentition favorably; and the throat and the genital organs, which, as well as the axillæ, were covered with a fine down, gave her the appearance of a girl of 13 of the negro race. M. Ramon de la Sagra continued to see the child up to the age of seven, at which time she was in good health, the development having steadily continued.

Dr. Mason relates ('Edin. Med. Journ.,' 1866) a case of vicarious menstruation. The patient began to menstruate at 8, and continued to do so until 11; then menstruation stopped until 13. A large abrasion appeared in the middle of the right cheek, suppurating in the centre, and inclining to bleed towards the circumference. The menstruation was now irregular. After a time this place healed; blood then oozed in drops from the skin of the face.

Dr. Fordyce Barker shows ('New York Med. Journ.,' 1865) the emmenagogue and galactagogue properties of Faradisation.

The *disorders of menstruation* are illustrated in the following memoirs:

Dr. Basset ('Presse Méd.,' 1866) relates a case of incomplete deviation of menstruation by the breasts. A woman, æt. 27, consulted him on account of periodical discharges of blood by the nipples. Menstruation, nevertheless, occurred regularly, but in scanty quantity. The patient had borne three children. Her general health was good.

Rokitansky ('Wien. Med. Wchbl.,' 1866) gives a case of fibrinous polypus of the uterus. A woman died from an accident. Menstruation had set in two days before the accident. The right ovary was found congested. The uterus contained a clot of the form of the uterine cavity. A controversy has been carried on between Scanzoni and Kiwisch as to the nature and origin of fibrinous or blood polypi.

Scanzoni says they do not occur independently of pregnancy. This case proves that even menstrual blood may give rise to them.

Dr. Maynet relates ('Gaz. Hebdom.,' 1866) a singular case of parotitis in a girl, with metastasis to the ovaries. She was relieved for a time by spontaneous free epistaxis, but had not menstruated when discharged.

Dr. de Amicis publishes (Naples, 1865) an interesting case in which hemiplegia of the right side with aphasia followed profuse metrorrhagia.

The influence of lead-poisoning in producing abortion and metrorrhagia is discussed by Benson Baker ('Obstet. Trans.,' viii, 1867).

Mr. Spencer Wells calls attention ('Med. Times and Gaz.,' ii, 1866) to the frequency with which "uterine epistaxis," or flow of blood, takes place from the uterus within the first days after ovariectomy.

"On the dysmenorrhœa, metrorrhagia, ovaritis, and sterility, associated with a peculiar form of the cervix uteri, and the treatment by division." In this memoir ('Trans. Obst. Soc.,' 1865) Dr. Barnes described and figured a form of cervix uteri which projected into the vagina as a conical body, the vagina appearing to be reflected off at a point nearer the os internum than normal. The seat of obstruction Dr. Barnes believes to be almost always the os uteri externum, the sound generally passing the os internum readily. Deviations of flexion and version almost always followed this original formation of the cervix; inflammation of the cervix, ovarian congestion, hæmatocele, dysmenorrhœa, and sterility, were frequent attendants. Dr. Barnes thought dilatation of the vaginal portion of the cervix sufficient; incision at the level of the os internum was unnecessary, and was dangerous from the risk of incising the large vessels which entered here. He preferred incision to dilatation by plugs, as being safer if performed by scissors. He exhibited an instrument for the purpose. He had seen relief from all the evils enumerated frequently follow his operation.

Dr. Marion Sims ('Obstet. Trans.,' 1866), recognising contraction and flexion of the cervix uteri as a cause of dysmenorrhœa, advocates dilatation by incision as the remedy. He considers it essential to expose the part to be operated upon by the speculum, and uses his duck-bill for the purpose. He seizes the cervix by a fine hook, then divides the vaginal portion of the cervix with slightly curved scissors, one blade being passed into the cavity; then a narrow-bladed, blunt-pointed knife, fixed at a proper angle, is used to divide the small amount of tissue on each side leading from the scissors-cut up to the very cavity of the womb. The bleeding, he says, is usually unimportant; but sometimes it is furious. This is to be arrested by passing sponge probangs right into the neck of the uterus. Then plugs with perchloride or persulphate of iron are applied, and removed next day, to be replaced by pledgets of wool soaked in glycerine. The wound, in cicatrizing, he says, often contracts considerably, and the operation may require repetition. This operation often cures dysmenorrhœa; sometimes it only modifies it, and in some cases produces no beneficial effects whatever.

Dr. Beatty ('Contributions to Med. and Midw.,' Dublin, 1866) re-

cognises that dysmenorrhœa may be due to constriction of the os uteri, and practises incision by Simpson's hysterotome, by aid of a three-bladed speculum. He says pregnancy has in some cases soon followed.

Dr. Emmet ('New York Med. Journ.,' 1865) describes the treatment of dysmenorrhœa depending upon flexion of the uterus. This flexion takes place gradually, owing to the leverage created upon the body of the uterus. An angle or elbow is thus formed in the cervix, which causes obstruction, and this is increased by the congestion attending menstruation. Dr. Emmet says it is not enough to divide the os externum, either laterally or through the posterior wall of the cervix. These incisions will not reach the point of angulation. Further incisions are required in the antero-posterior direction, both in the anterior and posterior wall at the seat of angulation. He makes the first incision through the vaginal portion of the cervix with scissors. The deeper incisions are made with a peculiar knife. The cervix is afterwards carefully plugged with lint soaked in glycerine. Great pains are taken with the subsequent dressing, to prevent the intra-cervical incisions from closing up. There is some risk of hæmorrhage by wounding the large vessels that surround the uterine neck. It is partly to obviate this that careful plugging is used. Dr. Emmet speaks well of the success in curing both dysmenorrhœa and sterility which has attended this operation. The memoir is one deserving special attention.

Mr. Spencer Wells ('Lancet,' May, 1865) objects to the operation of Dr. Marion Sims that it is not necessary to use the speculum in its performance; that it is not desirable or safe to incise the thicker middle layer of muscular fibres at the level of the os internum.

Dr. Kidd ('Dubl. Med. Press,' June, 1865) recognises cases where the painful menstruation is due to contraction of the os uteri. The operation he adopts is to divide the os with Savage's scissors, which cut on the outer edge, the blades protecting each other when closed. He uses a duck-bill speculum. He introduces a bit of rolled lead into the divided cervix to maintain the opening made.

Dr. Greenhalgh related a case ('Obst. Trans.,' 1866) in which fatal peritonitis followed an operation for the relief of dysmenorrhœa by incision of the os internum uteri.

Dr. Henry Bennet ('Obst. Trans.,' viii) deprecates the tendency to resort to surgical treatment for the relief of dysmenorrhœa. He advocates the use of tents to dilate.

Dr. Tilt ('Obstet. Trans.,' viii), in a memoir "On the extreme surgical tendencies of uterine pathologists, and on the division of the cervix uteri," takes views similar to those of Dr. Bennet.

Professor Martin, in a paper "On stenosis of the os uteri," says ('Mon. f. Geburtsk.,' 1865) contractions of the os uteri affect either the os externum alone, or extend along the cervical canal, by swellings of the arbor vitæ as far as the os internum. They are mostly of inflammatory nature, and in the majority of cases he thinks they have their origin in gonorrhœa. Dysmenorrhœa commonly attends. He divides the contraction by an instrument of his own.

Dr. Mayer (*ibid.*) describes two kinds of dysmenorrhœa. The first shows itself before the bleeding, and disappears; it is probably due to congestion in the ovary. The second comes on with the bleeding, and is due to difficult escape. This last often depends upon flexions of the uterus. He also signalises another kind of dysmenorrhœa. Pains set in midway between two periods, last for two or three days, and cease with a profuse blennorrhœa. They are so regular that women call them their "mid-pains." Examination commonly reveals chronic metritis and flexions; but the pains persist after healing these complications.

The pathology of deviations and flexions is also discussed by Drs. Grenet and Gallard ('Gaz. d. Hôp.,' 1865). Grenet makes free use of actual cautery in the treatment.

Dr. Ed. Lumpe ('Wien. Med. Wchnschr.,' 1866) gives cases of sterility caused by uterine flexions. He used laminaria and spongetents.

Dr. H. G. Wright describes ('Lancet,' i, 1866) a new form of intra-uterine pessary for the treatment of flexion. The principle is that it is not fixed, like Simpson's, but supports itself by the elastic expansion of two wings when introduced, so that it makes one with the uterus itself. Dr. Aveling and Dr. Greenhalgh describe similar instruments (*ibid.*)

Pelvic hæmatocœle, although sometimes depending upon other causes, may be conveniently ranged under disorders of menstruation. The subject is discussed in a very excellent critical essay based on two instructive cases by Dr. Paul Kämpfle ('Jen. Ztschr. f. Med.,' 1866).

Some laws of the sterility of women, and the laws of fertility of women, are illustrated from a statistical point of view by Dr. Matthews Duncan ('Edinb. Roy. Soc.,' 1866).

Anomalies of Structure.

Dr. Rabe relates ('Monatsschr. f. Geburtsk.,' 1865) a case of double uterus and vagina. The patient had not been pregnant.

Dr. Popper gives (*ibid.*) a case of duplex vagina; there was also double uterus. The patient was a prostitute, and had been examined on account of blennorrhœa.

A case of bipartite uterus with double vagina came under Dr. Greenhalgh, at St. Bartholomew's. The patient had been married thirteen years without pregnancy. The right vagina was open and capacious; the left was small, and closed by a hymen. She had a large abdominal tumour.

Dr. Elleaume ('Gaz. d. Hôp.,' 1865) publishes a case of absence of vagina and uterus.

Atresia of the female genital passages is also treated of by Dr. Albert Puech (Paris, 1864), in a valuable and complete historical and practical account of the various occlusions of the uterus and vagina.

Prof. Faye, of Christiania, relates a case ('Mém.,' 1866) where vagina and uterus were both absent. The patient, æt. 30, began to suffer at 20 from determination of blood to the head.

Dr. Dolbeau relates ('Gaz. d. Hôp.,' 1866) a case of retained menstrual fluid, with absence of vagina. A passage was opened up by operation, and relief afforded.

Dr. L. Mayer illustrates ('Mon. f. Geburtsk.,' 1865) the subject of *acquired vaginal atresia*. He insists upon the importance of distinguishing whether occlusion is congenital or acquired, operative measures being much more promising in the latter kind. With the exception of the cases where the vagina is deficient, and of hymeneal atresia, which last consists in excessive development, both the kinds are traced back to inflammatory processes. In the congenital atresia the inflammatory adhesions are apt to affect very deep-seated parts, and to involve, to a greater extent, the surrounding structures; and coming as the inflammatory action does upon organs imperfectly developed, the condition is far more serious than it is in the acquired kind, where inflammation attacks developed organs; in these, moreover, the adhesions are less deep-seated. Operations are, therefore, more promising in the acquired form.

The same subject, especially in reference to diagnosis, is discussed by Dr. Bryk ('Wiener Med. Wchnschr.,' 1865).

Dr. R. T. Tracy ('Australian Med. Journ.,' 1865) describes a case of traumatic occlusion of the os and cervix uteri.

Dr. Caffé ('L'Union Méd.,' 1866) cites cases from Michon, and adds one of his own, of spasmodic occlusion of the vagina. He effected dilatation by a bivalve speculum. A case of *vaginismus* was successfully treated by Dr. Murray ('Lancet,' 1866) by nitrate of silver and iodine.

The *position of the uterus* is described by Dr. M. Claudius ('Med. Times and Gaz.,' 1865).

Deviations of position are treated of in the following:

Gustav Braun relates ('Wien. Med. Presse,' 1865) cases of and remarks upon *ante flexion*. He treats these cases first with the sound, then with lever pessaries, the particular form being the open ring.

Prof. E. Martin also ('Berlin. Klin. Wchnschr.,' 1865) discusses the *flexions and versions of the uterus*, and their treatment by lever pessaries.

The use of lever pessaries is also discussed by Dr. O. Spiegelberg ('Wurzb. Med. Ztschr.,' 1865).

The use of *intra-uterine pessaries* for relief of flexions is discussed by Prof. H. Hildebrandt ('Mon. f. Geburtsk.,' 1865). He says the first and almost instantaneous relief of the nervous symptoms caused by the bent uterus is obtained on straitening it, and that complete cure may be obtained by the intra-uterine pessary. He excludes their use when there is inflammation.

Cases in which retroflexion of the uterus was successfully treated was related by Dr. Beatty (1866).

The nature and treatment of *procidentia uteri* are well illustrated in a paper by Dr. Marion Sims ('Obst. Trans.,' vii). He shows that the first condition of prolapsus uteri is commonly cystocele or descent of the anterior wall of the vagina with the base of the bladder; the uterus is then drawn down. Acting on this view of the cause, he removes, in

a V shape, strips of mucous membrane from the *anterior* wall of the vagina as far as the edge of the os uteri. The parts being restored by sutures, the anterior wall is contracted, and its power of supporting the uterus is regained.

Dr. Thomas A. Emmet, New York ('New York Med. Journ.,' April, 1865), describes with necessary minuteness an operation designed for the same end as Dr. Marion Sims, and so modified as to obviate some imperfections which experience had brought to light in it.

Mr. Robert Ellis ('Lancet,' 1865) describes an operation for the *radical cure of prolapsus uteri*. He insists that a square surface should be pared from the vaginal mucous membrane behind, making it as broad as possible near the cervix uteri. By bringing the edges together, a broad firm column, the whole length of the posterior wall of the vagina, is thus obtained to support the uterus. He uses a flat silver ribbon instead of round wire for sutures, and fixes them by a twist after passing the fissure of a double "quill," made by soldering two pieces of silver together at the ends.

Dr. Da Costa, in an elaborate memoir on *vesico-vaginal fistula*, addressed to the Academy of Medicine of Brussels ('Journ. de Brux.,' 1865), proposes the following plan of treatment:—He makes use of the sphincter ani to retain the urine, by making an opening in the posterior vaginal wall into the rectum above the sphincter. This is to be large enough to permit the free passage of urine, menses, and other uterine discharges. When this opening has cicatrized, he proceeds to close the vesico-vaginal fistula by the interrupted suture. Reference is also made to cases and papers by Thomas Bryant ('Guy's Reports,' 1865), Dr. Heppner ('Petersb. Med. Ztschr.,' 1865), and A. P. Banon ('Dubl. Quart. Journ. of Med. Science,' 1865).

Dr. O. v. Grunewaldt ('Petersb. Med. Ztschr.,' 1865) describes at great length *chronic uterine catarrh*. He insists much upon the many consensual symptoms attending. These are generally more complained of by the patients than the local symptoms. All, he says, are called forth by reflex irritation. Headache is commonly due to this rather than to the anæmia, consequent upon constitutional impairment. The same applies to backache, also to the cardiac and gastric symptoms.

Dr. E. Wagner relates a case of peritonitis ('Arch. f. Heilk.,' 1866) caused by purulent catarrh and perforation of the right Fallopian tube.

Certain uterine affections in their relation to phthisis pulmonalis are treated of by R. Battye, M.D. ('Obst. Trans.,' viii). The author's attention to this subject had extended over fourteen years, during which time he had collected numerous examples of various forms of uterine leucorrhœa coexisting with affections of the lungs. He brought eleven cases before the society, minutely describing the symptoms and termination of each. As soon as the leucorrhœa was cured or relieved the chest symptoms also either entirely disappeared or lessened in extent and force. He strongly urged early special attention during the treatment of phthisis to uterine discharges when present, as such caused a constant drain on the constitution. As to treatment, he seldom used local remedies, but trusted to acids, vegetable bitters, and cod-liver oil. The

salts of iron were found by him to be very valuable in the chronic forms, having a special effect on the lung condition as well as on the uterine discharge.

Dr. Bennet discusses ('Lancet,' i, 1865) the relation between phthisis and uterine disease.

The early history of uterine pathology is traced in an interesting memoir by Thomas G. Wright ('Brit. and For. Med.-Chir. Review,' 1865).

Dr. Greenhalgh and Dr. Eastlake relate a case in which peritonitis and death resulted from wearing an intra-uterine stem ('Obst. Trans.,' viii, 1866).

Dr. Braxton Hicks ('Obstet. Trans.,' viii, 1866) describes specimens of true echinococci which escaped from the vagina.

Dr. Meadows describes a case of great hypertrophy of the labia majora ('Obst. Trans.,' viii).

Dr. Rieken relates ('Journ. de Brux.,' 1865) a case of *remarkable enlargement and degeneration of the clitoris*. The mass weighed 6lb. It consisted of fibrous white tissue, enclosing a nucleus. It was extirpated successfully.

Dr. T. H. Tanner related cases in which he had excised the clitoris (ibid.) in the treatment of hysteria, &c. His experience was not encouraging. In the discussion the physiological basis of the operation was contested by Drs. Aveling, Wynn Williams, Tyler, Greenhalgh, and Barnes, and many cases of total failure in practice were narrated. On the other hand, Drs. Routh, Rogers, and Tanner spoke with more or less qualified approbation of Mr. Baker Brown's practice. In notes to the paper will be found references to the bibliography of the subject cited by Dr. Tanner and Dr. Aveling.

Dr. Walz, of St. Petersburg, relates ('Mon. f. Geburtsh.,' 1865) his experience in the treatment of cancer of the uterus. There is no general treatment. As early as possible the smallest induration must be removed, together with some sound tissue beyond. After removal by the knife many relapses are seen, fewer when caustic potash is used. The galvano-caustic has the best results.

Dr. Routh ('Obstet. Trans.,' viii) advocates and illustrates the treatment of epithelial cancer of the cervix uteri by the application of a solution of bromine to the diseased structure, having previously removed a portion by cautery or *écraseur*, or not, according to circumstances.

Uterine Tumours.

An example of very numerous fibroid tumours in the uterus was shown by Dr. Woodman ('Obst. Trans.,' vii).

Dr. Barnes (ibid.) exhibited a fibroid tumour removed from the uterus by enucleation, and a large fibroid tumour expelled spontaneously from the uterus (ibid.).

A case in which a large fibrous tumour of the uterus with spontaneous sloughing, and death from peritonitis, was narrated by Dr. Braxton Hicks (ibid.).

See a case by Dr. Madge (*ibid.*, viii).

A large fibrous polypus was shown by Dr. Greenhalgh (*ibid.*, vii).

A case of fibro-cystic disease of the uterus was narrated by Dr. Routh (*ibid.*). An operation for removal by gastrotomy had to be abandoned.

A case of removal of a fibroid tumour of the uterus weighing 29 lb. (death on the third day) is narrated by Dr. J. D. Gillespie ('*Edin. Med. Journ.*,' July, 1866).

Dr. Storer relates ('*Amer. Journ. of Med. Science*,' 1866) a case in which he completely extirpated both ovaries and the uterus by gastrotomy. He gives a collection of similar cases. His patient recovered.

Kœberle refers ('*Gaz. d. Hôp.*,' 1866) to the above case, gives a *résumé* of others, and adds the following:—1. Both ovaries, the uterus with a fibroid weighing 7 kilogr., were removed in 1863. The person is in excellent health. 2. This was communicated to the Strasbourg Medical Society in 1866, at the same time as another case in which the inverted uterus with hanging polypus was extirpated. In the former case the ovaries were found healthy; but the tumour with the uterus, weighing 5 kilogr., was removed. The woman recovered. Three other cases referred to ended in death.

The subject is also discussed systematically by Dr. Caternault ('*Gaz. d. Hôp.*,' 1866) and in a special memoir (Paris, Baillière, 1866). He assisted Kœberle.

In one of five cases of ovariectomy reported by Mr. Nunneley ('*Patholog. Trans.*,' 1866) the tumour, after removal, was examined by Dr. Graily Hewitt and Mr. Wells. They reported that it was uterine, although Mr. Nunneley says that all who were present at the operation were of opinion that it was ovarian. The patient recovered.

Five cases of ovariectomy are recorded ('*Lancet*,' ii, 1865) occurring in the North Staffordshire Infirmary. Three recovered, two died. In the same institution a fibro-cystic tumour of the uterus was operated upon in mistake for ovarian disease. It is stated that the uterus felt normal by the vagina. The removal of the tumour was not attempted. The patient died in 53 hours of peritonitis.

A fibro-cystic tumour with diseased uterus and ovary is described by Mr. Spencer Wells and Drs. Dickinson, Wilson Fox, and Cayley ('*Pathol. Trans.*,' xvii). The tumour had yielded fluid by tapping; it was not possible to remove it all during life. Examination, after death, of pelvic structures, as well as of the tumour, led to the conclusion that it was impossible to decide whether the tumour was an ovarian cyst or had originated in a glandular sarcoma of the uterus, which had subsequently undergone cystic degeneration. The cyst closely resembled an ovarian cyst, and no trace of the corresponding ovary was visible; but, on the other hand, the absence of definite ovarian structure in its walls and some traces of glandular and muscular tissue are suggestive of uterine origin.

See also a case of fibro-cystic disease of the uterus mistaken for ovarian disease; attempted extirpation; failure; death by rupture of a vessel within the cyst; by Dr. Routh ('*Obstet. Trans.*,' viii).

A uterine tumour removed by mistake for a tumour of the ovary, by T. Holmes ('*Pathol. Trans.*,' xvii, 1866). The tumour was of large size, had grown very rapidly, and had yielded fluid on tapping. The patient died shortly after the operation.

There is a large collection of cases of fibroids of the uterus ('*Schmidt's Jahrb.*,' No. 4, 1866), in continuation of a collection in the same journal (129, 1865). Some of these cases illustrate the facts that these tumours may simulate labour or acute retroversion of the uterus. Other cases complicated with pregnancy will be found under the head of "Pregnancy."

Dr. Riedel ('*Mon. f. Geb.*,' 1865) relates a case of a tumour removed by extraction by hooks and Museux's forceps.

Dr. Justi relates a case of a woman, æt. 43, married, without children, who enlarged to the size of pregnancy, and died of hæmorrhage. Dissection showed the uterus raised by fibroid growth above the navel. There was no proper uterine cavity, the place being occupied by a hard tumour, which weighed 10 lb.

A fibro-cystic tumour of the uterus is described by Dr. Hilton Fagge ('*Patholog. Trans.*,' xvii, 1866). The tumour was removed post-mortem. It was formed of a collection of large cysts, and was covered on all sides by a layer of hypertrophied uterine muscular fibre. Many of the smaller cysts were quite cut off from one another by septa. The fluid within was of a light pink or dark red; the substance contained a large quantity of earthy deposit, made up of carbonate and phosphate of lime.

Professor Faye has published (Christiania, 1866) an elaborate memoir on inflammatory, hypertrophic, and fibrous tumours of the cervix uteri. He relates in detail a case of unusually large fibrous tumour, growing from the anterior lip of the vaginal portion of the uterus. It is of interest chiefly from the comparative rarity of such tumours in this situation.

Dr. Andrews exhibited ('*Pathol. Trans.*,' xvii) a specimen of malignant disease of the uterus, involving the whole of its internal surface, except the inferior portion of the canal of the cervix; secondary deposits in both lungs. The uterus was enormously enlarged, rising nearly to the ensiform cartilage; external surface smooth; two pints of offensive fluid escaped from the cavity, which was occupied by a fetid sloughing mass, springing from the whole of the internal surface, except the lowest inch of the cervical canal. The mass consisted of large bony processes springing from an uneven base; it was infiltrated with blood.

Dr. Barnes exhibited to the Obstetrical Society a specimen of colloid disease, involving the uterus and ovaries, in a young woman, who died of pelvic hæmatocele, resulting from the rupture of vessels in the morbid mass ('*Obst. Trans.*,' viii).

A case in which fibroids of the uterus became infiltrated with cancerous growth, proceeding from primary cancer of the vagina, is reported by Drs. Benporath and Liebmann ('*Mon. f. Geburtsk.*,' 1865).

A case in which epithelioma was propagated by contact from the

posterior to the anterior wall of the vagina is recorded by Dr. Cayley ('*Pathol. Trans.*,' xvii, 1866).

Dr. Routh ('*Obst. Trans.*,' xiii, 1866) advocates the use of bromine in solution, mij to ʒj of spirit, as a topical application to cancerous disease of the uterus, and narrates cases in which benefit, if not complete success, was obtained. Dr. Eastlake (*ibid.*) advocates iodoform.

Dr. Meadows exhibited (*ibid.*) a case of cauliflower excrescence removed by wire *écraseur* from the posterior lip of the uterus.

On amputation of the cervix uteri, and other methods of local treatment, in cases of malignant disease of the uterus and vagina, by J. Braxton Hicks ('*Guy's Reports*,' 1866). Dr. Hicks gives a further series of cases. He insists especially upon the following points:—1st. That a great amount of success in procuring immediate relief, and in postponing the development of the disease, is obtained by amputation. 2nd. That, as to the mode of amputating, the wire-*écraseur*, applied without drawing the uterus down, is preferable. He objects that, in drawing down the uterus, there is danger of opening the anterior or posterior peritoneal pouches.

Dr. Broadbent, who suggested the injection of acetic acid into cancerous growths, with a view to arresting the cell-growth, proposes ('*Med. Times and Gaz.*,' 1866) to inject acetic acid into ovarian cysts. Dr. Junker (*ibid.*) raises objections to this treatment, urging danger lest the acetic acid should set up peritonitis, &c., by osmosis.

Diseases of the Ovaries and Appendages.

Reference is made to a large multilocular ovarian cyst, with a pedicle formed by omentum, by Dr. Barratt ('*Pathol. Trans.*,' xvii, 1866).

Alveolar disease of both ovaries, by Mr. Spencer Watson ('*Pathol. Trans.*,' xvii, 1866).—In Mr. Watson's case the specimen was removed after death. The walls of the cyst consisted of fibrous material and fibroid cells, arranged in laminæ, and interlacing with numerous granulated corpuscles of large size scattered throughout their substance. In some parts, even of the cyst-walls, spaces filled with glandular or epithelial cells were found.

Cancer of the ovaries, producing fatal obstruction of the bowels; cancerous nodules of the peritoneum, by Mr. Christopher Heath ('*Pathol. Trans.*,' xvii, 1866).

Large ovarian cyst closely adhering to the uterus; three large fibroid tumours of the uterus coexisting, by Dr. Hare ('*Pathol. Trans.*,' xvii, 1866).

Dr. Rose, of Kidderminster, discusses ('*Lancet*,' ii, 1866) the probable hereditary tendency of ovarian dropsy.

Dr. Tyler Smith exhibited a portion of a dermoid cyst with teeth attached passed per rectum by a lady who had for a year and a half previously evacuated teeth and hair ('*Obstet. Trans.*,' vii, 1865).

A dermoid cyst, attached to the right ovary, removed after death, was exhibited by Dr. Woodman ('*Obstet. Trans.*,' vii, 1865).

Mr. B. Marsack relates ('*Brit. Med. Journ.*,' 1866) a case of ovariotomy in which the cyst contained fœtal *débris*.

Mr. Keith relates ('Lancet,' July, 1865) a case in which the ovarian cyst was found gangrenous. He, however, removed it. The patient made a quick recovery. The cyst was multilocular, and weighed $57\frac{1}{2}$ lb.

Mr. Spencer Wells relates a case ('Wien. Med. Presse,' 1865) of a woman in whom pregnancy was complicated with ovarian tumour. Ovariectomy was performed, then the Cæsarean section, it being found that a second tumour presenting itself was the uterus, and it having been punctured. The patient recovered. Silk sutures were applied to the peritoneal margins of the uterine wound.

Dr. Murchison showed to the Pathological Society ('Trans.,' 1866) a specimen of ovarian cyst which had emptied through the intestines. Diarrhœa came on, and pus passed by the bowels. Coincidentally with this, percussion over the tumour gave a clear sound. The urine was albuminous. Both kidneys were fatty. The spleen was waxy and very large.

Dr. Williamson relates ('Lancet,' i, 1866) a remarkable case of ovarian disease. It was at first complicated with pregnancy. Great distress ensued, and labour was induced prematurely. Subsequently an attempt to extirpate the tumour was made. This was unsuccessful. After protracted suppuration and irritative fever, the patient eventually made a good recovery.

A multilocular cyst of the ovary in a girl, æt. 11, came under the care of Dr. Garrod at King's College Hospital. She died after tapping. The walls of the cyst were very thick. There were many cysts; one contained a mass of hair and fat, with fragments of bone. The uterus and left ovary were natural.

Dr. Stilling, in a memoir on ovariectomy ('Ztschr. f. pract. Heilkunde,' &c., 1865) describes the steps of the operation, and insists upon what he calls the extra-peritoneal method of dealing with the pedicle. The tumour must be drawn out of the abdomen, then divided, leaving a plate-shaped piece the size of a fist. The cut surface must be attached to the edges of the closed abdominal wound. Thus, the bleeding and suppuration take place outside the peritoneum. Three cases treated on this plan recovered. Dr. Stilling ('Deutsches Klinik,' 1865) continues the report of cases of ovariectomy performed on his plan of extra-peritoneal tying and healing the pedicle. In commenting upon one fatal case he strenuously contends that ovarian cysts should never be tapped, as the adhesions thus caused make ovariectomy more difficult. In another case great difficulty occurred in getting at the pedicle, owing to the complication of a second tumour. It was at length secured by a Hutchinson's clamp. The patient died on the twelfth day of trismus and tetanus. Of three cases in this report, one recovered.

Mr. Spencer Wells discusses ('Brit. Med. Journ.,' 1866) the different modes of dealing with the pedicle in ovariectomy.

Mr. Clay, of Birmingham, makes good his claim (ibid.) to be the first to apply a combination of pressure by means of an "adhesion-clamp" with cautery in the management of the pedicle.

Mr. Baker Brown illustrates the use of the actual cautery ('Obstet. Trans.,' vii and viii) in ovariectomy.

Rokitansky relates ('Oesterr. Ztschr. f. pract. Heilk.,' 1865) cases of twisting and strangulation of ovarian tumours. He says it is not a very uncommon event. It may happen gradually or suddenly. If it occur suddenly, death may be rapid, but spontaneous reposition may take place during life. Unexpected fixing of a tumour hitherto movable, with symptoms of inflammation of the tumour and of peritonitis, indicate torsion and strangulation. Incarceration of the intestine may be brought about by torsion of an ovarian tumour. In consequence of torsion and strangulation, involution or shrivelling of a tumour occurs, explaining many cases in which ovarian tumours have disappeared.

E. Eichwald contributes an important memoir on colloid degeneration of the ovary ('Wurzb. Med. Ztch.,' 1865). He describes a number of cases observed in the clinique of Prof. Krassowski, of St. Petersburg. He divides the protein substances contained in the colloid fluids into two distinct groups, represented by mucin and albumen.

Two fibrous tumours of the round ligament of the uterus, by Mr. Spencer Wells ('Pathol. Trans.,' xvii, 1866). These tumours were of the sizes of an orange and of a cocoa-nut; they occupied the right groin, and were removed by operation. The growth was an excess of the fibrous tissue of the round ligament.

Case of cyst of the Fallopian tubes, by Dr. Meadows ('Obstet. Trans.,' viii).

A large abdominal cyst, simulating ovarian or uterine tumour; operation; death. Exhibited by Dr. Wynn Williams (ibid.).

A dermoid cyst developed in the Fallopian tube was shown by Dr. Ritchie (ibid.).

II. PREGNANCY.

Physiology and Pathology of the Ovum.

"On the formation and significance of the *corpus luteum*."—Dr. Spiegelberg ('Mon. f. Geburts.,' 1865) says the beginning of the corpus luteum is seen before the rupture of the follicle. Even in children the innermost layer of the wall of the ovisac shows a looser nature than the outer, and may be continuously separated from it, and is distinguished by a yellow colour. This layer consists of cells of connective tissue caught in a rich new formation, which is traversed by many large capillaries. At puberty this more developed inner layer is thicker in those follicles which are near the surface, the cells are more compressed, the capillaries form narrow coils close upon the adjoining epithelium, fatty metamorphosis is more advanced. Whilst, through advancing swelling of the follicle, the peripheral part of this layer is softened by fatty metamorphosis, it at last bursts, and the ovum escapes. (The subsequent changes are as described by others.) He makes the following remarks on ovulation. This is commonly attributed to ripening of an ovum. This, Spiegelberg says, is not so. On examining the follicles on the surface of an ovary he cannot tell which ovum is next destined to

escape. When we speak of the ripening of an ovum we make an entirely hypothetical assumption. What is observed at every menstruation is the *ripening of the follicle*, and this consists in the increase of the already begun growth and fatty metamorphosis of the wall of the follicle.

Professor Dohrn contributes a memoir on the microscopical anatomy of the mature investments of the human ovum ('*Monatsschr. f. Geburtsk.*,' 1865.) His plan was to make sections of ovisacs, after hardening, and to compare a number of these by juxtaposition. A section near the edge of the placenta traverses from within outwards the amnion, the gelatinous layer, the chorion, the decidua reflexa, and decidua vera. The *amnion* has two layers—towards the fœtus a cellular layer, outwardly a layer of young cellular tissue. The cellular layer consists of a single layer of polygonal cells, which adhere closely together. By addition of acetic acid large oval nuclei become apparent. On the placental termination of the investment of the umbilical cord, and on the amniotic investment of the placenta, we meet with spots where the cellular layer is swollen, and forms prominences often recognisable by the naked eye. These were first found in man by H. Müller. These are analogous to the carunculæ, long known on the amnion of many animals. They assume at times a plainly papillary form; in other cases they only form half-shot-like prominences, or only irregular elevations. In the second layer are found connective-tissue forms in various stages of development. This layer passes without a sharp boundary into the Wharton's tissue. The *gelatinous layer*.—This, which represents the remains of the albuminous fluid which in earlier time had collected in large quantity between the chorion and amnion, shows in man no organization. Its consistence, like its thickness, varies much. Chemically, it consists largely of mucin. In section it looks like a light seam dividing amnion from chorion. Dohrn adopts Bischoff's views concerning this layer. The *chorion* has towards the fetal side a connective-tissue layer, which is distinguished from that of the amnion by its greater thickness, and by its plainer intersection into intercellular substance. The outer layer is formed of round cells, with a central nucleus. Several layers (from four to ten) of these cells are superimposed. The *decidua* is never wanting in large, longish cells, with large round nuclei, troubled with fatty droplets and molecular granules. This is the chief formation. They are commonly found in the decidua vera and reflexa. They are not easily isolated. Between these cell-forms there is free fat, and also some free-lying nuclei. A connective stroma is not common. The fatty process is stronger and more diffused in the reflexa than in the vera. The further we go from the edge of the placenta the more fatty spots are found. Dohrn has verified the observations of Hegar and Eigenbrodt upon apoplexies of the decidua; fresh and old extravasations are frequently seen. The *placenta* preserves on its foetal aspect a layer of *maternal tissue*. The maternal is hardly distinguished from the foetal element by colour; the maternal lamella shines out white against the foetal red chorion-villi. This lamella varies much in thickness in different placentas. The layer nearest the fœtus exhibits a very sinuous, rarified tissue, the spaces between which

intercommunicate by irregular openings. This structure is also seen in the foetal laminae. In the few instances in which Dohrn has found stumps of vessels in the maternal placenta the surrounding tissue showed pathological conditions. For a small space over the centre of the cotyledons it is possible to separate the tissue of the maternal placenta from the villi, and thus to open the cavity of a blood-space in whose wall the villi lie exposed to the day, but in other places the connection of the two structures is so intimate that separation cannot be effected without laceration. Here are found vessel-less filaments which run from the maternal placenta to the points of the villi; these are described by Goodsir and Ecker. Beyond these filamentous connections there is no further organic relations between the maternal and foetal placentas. Dohrn says it is beyond doubt that in mature placentas the villi dip free, and without investment in the sinuses of the maternal placenta. If a preparation is taken from a somewhat deeper layer from the cotyledon, no tissue of the maternal placenta is found; there is nothing but villi ramifications; but septa of the maternal placenta project deeply between the cotyledons. Hence by far the greatest part of the foetal placental tissue serves for the circulation of the blood, and not for interchange with the maternal placenta. The nearer the approach to the term of labour, the more the conditions of nutrition of the decidua vera, reflexa, and serotina, differ. The vera has now only a few vessels; in the reflexa, even in the middle of pregnancy, no vessels can be found; on the other hand, the serotina is a rarified tissue, perforated with large blood-spaces. This difference accounts for a material difference in the retrograde metamorphosis of the three decidual elements. In the maternal placenta of a mature afterbirth are seen cells which by their size, well-developed nucleus, and the slight extent of nucleoli and fat-droplets, are distinguished from the other decidual cells. Most of them have one nucleus; but many have two, three, even to sixteen, nuclei. They are of remarkable size, from 0.03—0.04 millimètres. They are sometimes drawn out or provided with interlacing prolongations; sometimes they have numerous enlargements, each of which has a nucleus. These tissue-elements are commonly found in a structureless substance. When such structures are found in great abundance the assumption that the tissue bearing them is in course of retrograde metamorphosis is not justified; but much rather is it to be inferred that this tissue is subjected to an active interchange of material and to active growth, which is contrary to the old idea, according to which the falling of the maternal placenta depends upon a fatty degeneration of its tissue. It is much more reasonable to conclude that it is the increase of the blood-spaces, attended by advancing growth of tissue with the active cell-propagation, that brings about the detachment of the placenta. The question whether many nucleated cells extend beyond the edge of the placenta has been considered by Kölliker. Dohrn has found them an inch from the edge in the decidua vera. Further than this they are not found. This depends, again, upon the different vascularity of the decidua vera and serotina. The elements of the vera and reflexa much more distinctly pass into fatty metamorphosis.

M. Joulin ('Arch. Gén. de Méd.,' July, 1865) contributes "Anatomical researches upon the membrana laminosa, the condition of the chorion, and of the circulation in the placenta at the end of pregnancy." He looks upon the received opinion, that the membrane which covers the foetal surface of the placenta when the amnion is removed is formed from the chorion, as incorrect. He calls this investment the membrana laminosa, and dates its origin from the allantois, regarding it as the remains of this structure formed out of a thickened reticulated magma upon the foetal surface. He distinguishes the *laminosa* and *chorion* by their histological elements and their situation upon the placenta. He examines the following points:—1. The division of the placental vessels. 2. The nature of the insertion and course of the villi. 3. The membrana laminosa. 4. The relations of the villi to the circulation in the maternal vessels, whereby he seeks to prove that at the end of gestation the chorion is no longer in the condition of a continuous membrane stretching over the placental surface.

1. During the formation of the allantois the vascular branches are directed to the foetal surface of the chorion, and this undoubted fact serves to prove that the membrana laminosa cannot be a part of the chorion, since it is found in the complete ovum upon a spot more superficial than the vascular branches. On leaving the umbilical cord the vessels worm themselves through the substance of the *laminosa*, and, after a course of variable length, cross it obliquely to reach the placental substance. After a further course of from a millimètre to several centimètres, they terminate, forming tufts, which again divide to reach the villi. 2. In the formation of the allantoid circulation the chorion separates the vessels into two different layers; on its foetal surface the trunks run, upon the uterine surface run the capillary vessels. At the end of pregnancy this separation in the placenta has vanished; the trunks are found everywhere in the midst of the mass of villi. The villi, especially, no longer take their rise at the same level as before, and their direction is not always perpendicular to the surface of the organ; their insertion is effected at the ends of the tufts, in every possible depth and direction. The chorion, obliterated through the growth of the vessels, ceases in this way, by its vanishing from the placental surface, to be a distinct membrane. 3. Further, the histological elements of the *laminosa* are quite different from those of the chorion. It consists of bundles of fibres in parallel layers, only now and then crossing, of amorphous matter and some fat-granules. No nuclei or molecular granulations, which constitute the basis of the chorion-tissue, are found; no villus takes its origin from the *laminosa*, but the connection on either side is only through an amorphous tissue which binds the villi together. By teasing and maceration it can be completely separated from the surface of the membrane and from the trunks of the vessels. The *laminosa* can be separated into several layers. One layer is especially thick between the great branches of the tufts. Closely united to the vessels, it accompanies them, in the form of sheaths, into the depth of the placenta, and sends to the circumference of the organ lamellæ which reach the villi, without, however, the *laminosa* possessing anywhere vessels of its own. 4. These facts involve a change in the

doctrine of the relation of the villi with the uterine sinuses. The villus-mass is too large for the capacity of the sinus or utricular glands. The maternal blood does not reach the intercotyledonal spaces, and the contact-surfaces of the uterus and of the placenta are quite smooth. The passage of the villi into the sinuses is only possible as far as the extremities. Nutrition takes place through the medium of the amorphous tissue which surrounds the divisions of the villi, and which is a continuation of the hypertrophied epithelial layer, which on the surface of the sinus separates the villi from the maternal blood. The transmission of the constituents of the blood takes place in the capillaries of the tissue concerned through endosmosis and exosmosis.

Dr. V. Hüter gives ('Mon. f. Geburtsk.,' 1866) an elaborate memoir on "*The velamentous insertion of the umbilical cord.*" He says the attempt to explain the insertion of the cord in the placenta by the hypothesis that the allantois is carried with the chorion only to the destined seat of the placenta must be abandoned, for it is well established that in early ova the whole chorion is surrounded with the vessels of the allantois. Before the atrophy of the villi begins there is one spot of the chorion richer in vessels than the rest. At this spot the vessels unite to form the umbilical cord. When this more vascular spot is found where the chorion is united to the decidua serotina, the cord will have its insertion in the placenta. When, on the other hand, the more vascular part is found on a part of the chorion opposed to the decidua reflexa, then will the cord be attached to a part of the chorion which at a later period will be bare of villi, thus forming a velamentous insertion.

This mode of insertion in certain cases imperils the safety of the child, and Hüter examines the conditions of safety and danger in detail. He premises that the insertion of the cord is never more than four to five inches remote from the border of the placenta. If the vessels of the cord which are inserted in the membranes have their course at a distance from the os uteri, the rent in the membranes will be out of reach of these vessels, and the labour will not be imperilled. When the insertion is near the os uteri there is liability of prolapsus of the cord. When the vessels of the cord run in the lower segment of the membranes near the os uteri they are liable to be rent or compressed. Under these latter conditions the child is likely to be born asphyxiated.

Dr. C. Hüter ('Mon. f. Geb.,' 1865) describes the lymphatic vessels of the human ovum-membranes. He says when the amniotic epithelium is infiltrated with solution of potassa white spots appear; these are probably open canals, which are in connection with a very cellular canal-system found between the amnion and chorion.

Dr. Madge ('Obst. Trans.,' viii) brings additional arguments in support of former writings, contending that the utero-placental arteries and veins are too small to serve the purpose of conveying blood to and from the placenta for the purposes of foetal nourishment, or to be more than a very trifling source of hæmorrhage on their rupture at childbirth. They appear to be nothing more than vessels of nutrition to the parts in which they are found. The supply of foetal blood Dr. Madge

contends takes place by endosmosis through the utero-placental decidua.

In the discussion on Dr. Madge's paper Dr. Braxton Hicks expressed himself as having arrived at similar conclusions.

Dr. R. Uvedale West (*ibid.*) related several cases of "battledore placenta," in which the funis was inserted in the membranes, and divided into its vessels at a considerable distance from the edge of that organ; and described how great doubt and awkward embarrassment may arise to the accoucheur when, as happened to the author, this anomaly occurs with one of the funes of a twin placenta, through its accidental tearing away from its very lacerable attachment.

Mr. J. C. Richardson (*ibid.*) describes a double placenta; that is, two masses of placental substance connected by one cord and belonging to one embryo.

Diseases of the placenta are illustrated in the following:

Dr. Mattéi ('Gaz. d. Hôp.,' 1865) describes placentitis as a reality. It exists in the acute condition from congestion, with commencing ramollissement, to the formation of pus, which is exceedingly rare. The same degrees of hepatization which exist in inflamed lung are found in the placenta. When the inflammation is partial and the child survives, the inflamed tissues usually remain impermeable to blood, and after a while fat is deposited in their contracted interstices, constituting the fibrous tissue of the English. Placentitis is very apt to occur in successive pregnancies.

Dr. Brunton exhibited ('Obstet. Trans.,' viii) a specimen of placenta having a distinct cyst, containing pus on the maternal surface. The child was alive and strong. He also exhibited another placenta containing a solid tumour, round, the size of a small egg, in the parynchymatous substance. It appeared to be of fibrous character.

Mr. John Marshall (*ibid.*) exhibited a specimen of diseased placenta, which was described by Dr. Graily Hewitt. It appeared to be an example of effusion of fibrin.

Dr. John A. Byrne ('Dub. Quart. Journ. of Med. Science,' 1865) relates two cases of diseased placenta. In one there was an undoubted syphilitic taint. The fœtus perished three weeks before birth at term, and the placenta was extensively fatty. In the other case there was this point of interest, namely, that a syphilitic taint was connected with hydatidiform degeneration of the chorion. When about four months gone she complained of sickness, anasarca, and great size of the abdomen, then hæmorrhage, and the expulsion of the vesicular mole. (The fact, however, that this degeneration of the chorion is not usually connected with syphilis is so important, that it is proper to look upon Dr. Byrne's case as exceptional.)

Two cases of hydatidiform degeneration of the chorion, associated with albuminuria, are recorded by Dr. Woodman ('Obstet. Trans.,' vii).

A third case of the same, by Dr. Barnes (*ibid.*).

A case, illustrated by a drawing, of hydatidiform degeneration of the ovum is also described by Dr. Russell (*ibid.*).

Mr. Ley ('Med. Times and Gaz.,' 1866) relates a case of hydatiginous chorion, which in its course nearly simulated that of natural pregnancy and labour. It occurred in a young woman, as the result, probably, of first conception. The secretion of milk came on copiously the third day after expulsion of the mass.

Dr. Braxton Hicks has re-examined the subject ('Guy's Reports,' 1865). The formation depends, he says, upon a continuation of the growth of the villi after the normal type, and is not due to any super-added impulse, as is implied in the term "proliferous cyst." The first difference apparent coincident with the enlargement of a portion of the villus, is the filling of it throughout by either complete cells or by some in an incomplete state. These entirely fill up the interior, rendering the appearance of the dilated part opaque. Some of these cells have branching connective-tissue-nuclei (germinal matter—Beale) distributed in a linear manner or irregularly, in variable states of formation, connected together frequently, especially at a later period, in a stellate manner. It is the growth of these elements that distends the villus at the commencement of the change. After a time a clear fluid infiltrates between the cells, while about the same time many of them undergo dissolution; also the germinal matter more completely matures itself into connective tissue, commonly of the stellate variety.

Cases of hydatiginous degeneration of the placenta are reported by Dr. Valerius ('Journ. de Méd. de Brux.,' 1865).

Dr. Hahn describes a case of hydatid mole, in which there was a large cystic formation in the umbilical cord ('Mon. f. Geb.,' 1865). He discusses at length the nature of this sac, and concludes that the embryo died in consequence of the degeneration of the chorion villi and the increasing pressure of excess of liquor amnii.

The *irregularities observed in the placenta* in 2471 labours are noted by Dr. Valenta ('Mon. f. Geb.,' 1866). In 67 cases the placenta was *near the os internum*; hæmorrhage occurred in 17 of these. In 4 cases the placenta was distinctly *prævious*. In 25 cases the *adhesion* was too strong, in 27 too loose. In these there was more or less bleeding. *Placentæ succenturiatæ* were observed 23 times; in one case there was *duplex placenta*, *i. e.* the subsidiary placenta approached in size the main placenta; in several cases there were two or more succenturiate masses; 12 cases of *remarkable size* occurred.; *anomalies of texture* were observed in 697 cases; so-called fibrin-masses were found in 267, usually on the foetal surface; only in 23 did the masses extend through to the maternal surface. The so-called fibrin-ring, generally combined with fibrin-masses, was seen 182 times. *Cysts*, generally with serous contents, were found under the amnion, from which they were easily separated, in varying number, on the foetal aspect of 56 placenta; these mostly showed, at the same time, fibrinous degeneration. Calcareous deposits were found in 136 placenta, always on the uterine surface, excepting in two or three cases, and in these the calcareous masses so pervaded the placenta that it was hardly possible to find a place where the knife could pass. *Recent apoplexies* were found in 13; *fatty degeneration* in 16, the others being mostly syphilitic; *œdema* in 21; *inflammation*, as revealed indistinct purulent collections and friability, 6

times. Of *anomalies of the cord*, prolapsus occurred in 23 cases; *torsion* in 4; twistings 593, *i. e.* in 467 cases once, in 59 twice, in 111 three times, in 4 twice; true *knots* 19 times; spontaneous *breaking* during labour twice; *dropsy of the cord* 4 times; the root of the cord was eccentric 1950 times, central 342 times, marginal 158, velamentous 21. As to the *liquor amnii*, *hydramnios* occurred in 104 labours; an extremely small quantity in 9. *Hydrorrhœa*, *i. e.* a watery or gelatinous collection between chorion and amnion, in 80. Whenever the liquor amnii was discoloured these collections had the same colour. *Discoloured liquor amnii* occurred in 211 cases. The *membranes* were too tough in 375 labours, requiring artificial rupture when near the outlet; too delicate, rupturing prematurely, in 580. Frequently there were blood extravasations between chorion and amnion, or on the outer chorion surface.

H. Lemser (Giessen, 1865) relates observations and experiments illustrating the *physiological separation of the placenta*. He describes the period of labour when the detachment takes place, the symptoms of detachment, its mechanism. The detachment is effected in primiparæ and secundiparæ with the expulsion of the child, and the presence of the edge of the placenta in the os uteri is a sure sign of complete detachment. Discharge of blood taking place before the above-mentioned symptoms is a certain indication of partial detachment. He has observed the mechanism of detachment in bitches. The mature placenta is more quickly and more completely separated by progressive uterine contractions than by simple reduction of the surface of the uterus. It is probable that subsequent infiltration of the placenta left behind in the uterus excites secondary contractions which cast the placenta.

Dr. Gusserow ('Mon. f. Geb.,' 1866) illustrates, by evidence of other observers and of his own, the seat of the placenta. He commences by excluding reliance upon the uterine souffle as evidence of the position of the placenta, denying that the two have any relation. He adopts Carmichael's mode of determining the seat of attachment by observing the distance of the rent in the membranes from the edge of the placenta after expulsion. He concludes, from 188 cases drawn from Hohl, Carmichael, Doherty, Hegar, Martin, Winckel and Gusserow, that the placenta was attached to the anterior wall of the uterus in 77 cases, to the hinder in 93, to the right in 12, to the left in 8.

See also Dr. Jounin ('Gaz. d. Hôp.,' 1865) on the insertion of the placenta in the lower segment of the uterus.

The different forms of *hydrorrhœa gravidarum* are described by Gräff ('Jenaische Ztschr. f. Med.,' 1865). He relates two cases, and says the premature bursting of the ovum-sac occurs more frequently than German observers think. Further, *hydrorrhœa* is not to be regarded as a definite form of disease, but only as a phenomenon which is common to many different anatomical conditions, such as premature detachment of the placenta, catarrh of the uterine glands, and premature detachment of the membranes, mostly brought about by an accident.

Sir James Simpson ('Edin. Med. Journ.,' 1865) relates three cases of *dropsy of the ovum*. In the first there was a twin pregnancy. The distension was so great that the membranes had to be ruptured; the

placenta was very large. In the second case the patient was subjected to a distressing carriage journey six weeks before expected labour; great pain followed. The membranes were ruptured, and a fœtus with abnormally formed head was expelled. In the third case the patient had suffered from distressing vomiting. Labour was excited by passing a catheter between membranes and uterus; a very large child was born asphyxiated. It had spina bifida.

Scanzoni ('Wien. med. Wchnschr.,' 1866) examines the *causes of the greater frequency of head positions in the human fœtus*. These are the result of the complication of all the factors—namely, gravity, the form of the uterus, the form of the fœtus, the quantity of liquor amnii, the contraction of the uterus during pregnancy and labour, the active movements of the fœtus. Until the development of the placenta the embryo can lie anyhow in the ovum, but the head hangs down from the greater weight beyond the insertion of the cord. Through the rapid growth of the cord this becomes of no moment upon the position, but the centre of gravity of the embryo is still in the head, and this part therefore still is lowest. About the middle of gestation the centre of gravity, by the rapid growth of the trunk, lies in the thorax, and, the longitudinal diameter of the uterus developing itself at this time more than the transverse diameter, so the fœtus may be too long in the head-position for the transverse diameter; on the other hand, the uterine cavity being more roomy in all directions, a cross position may easily happen. As the uterus grows the quantity of liquor amnii is more in proportion to the volume of the fœtus; thus, the head-position is preserved if the uterine walls do not possess any unusual flaccidity. But if up to this time the position have been cross, the future position will depend upon the resistance of the uterine walls, upon the resistance of the excited movements of the fœtus, and upon the advent of contractions of the uterus. Since in cross positions the head always lies lower than the breech, it is obvious that the head in a vertical direction of the fœtal axis will come downwards. From all which it results that, although during pregnancy the causes in operation may produce the most various positions, yet Nature mostly succeeds in placing the head over the pelvis. In spite of this, changes of positions are often found in the latter periods of gestation; and the more so, the more copious is the liquor amnii, the more spacious the uterus, the more yielding the uterine walls, the more energetic the movements of the fœtus, and the more frequent and intense the partial contractions of the uterus that arise in the last weeks of gestation. At this time the removal of the head from the pelvic brim is mostly hindered by the lesser quantity of liquor amnii in proportion to the size of the fœtus, by the arrest of the hyperplasia of the uterine walls, and hence, by the simultaneous growth of the fœtus, a distension of the walls is produced, accompanied by lesser yieldingness of the uterus and a tighter grasping of the fœtus. All these factors together hold the fœtus with the head downwards in a vertical position.

Dr. Valenta ('Mon. f. Gebertsk.,' 1866) has made some interesting and accurate observations upon the changes of position which the fœtus undergoes in pregnancy and labour. His observations are based upon

the examinations of 325 primiparæ, and 363 multiparæ in the hospital of Professor Spaeth. In 57·6 per cent. the position underwent no change; in 42·4 per cent. there was a change. His results are thus summed up:

1. Boys change positions much more frequently than girls, and this is more frequent in first than in subsequent pregnancies.
2. Change is more frequent in multiparæ, and stability is in proportion more frequent in primiparæ.
3. The greater the age of the woman the more probable is change of position, and especially is this the case in primiparæ in the latter weeks of gestation.
4. The frequency of change increases with the number of the preceding pregnancies.
5. Of all positions, the cranial are least liable to change.
6. Changes are most frequent during the last quarter of pregnancy, the more the epoch of labour is remote; especially do all positions exhibit least stability in the penultimate month.
7. The finding of a void, or at least a badly developed fornix vaginæ, with or without hydramnios, makes a change of position at a later period extremely probable.
8. Narrow pelves very frequently cause change of position.
9. Circumvolutions of the umbilical cord are the consequences of changes of position.
10. A too short cord appears to favour change.
11. All changes of position seem to tend towards the production of cranial positions.
12. Cranial positions mostly change only their presentations; thus, the change into first cranial is most frequent.
13. From cranial position the change is almost always into face-positions of the same kind.
14. Out of cranial positions breech-positions may arise.
15. Face-positions arise more frequently during pregnancy than during labour, and these may change during pregnancy; if so, always into cranial positions, and mostly of the same kind.
16. Forehead-presentations are only transition positions between cranial and face.
17. Forehead-positions arise more frequently during pregnancy than during labour.
18. Breech-positions also arise more frequently during pregnancy.
19. Breech-positions mostly change by the *culbute* to cranial positions.
20. Oblique positions are especially liable to change.
21. Oblique and cross positions most pass into the long axis by spontaneous evolution.
22. Self-evolution is a very frequent resort of nature.
23. Cranial, and especially the first cranial, are the most stable positions.
24. In every change of position the tendency is clear towards the most natural positions. These results confirm those arrived at from similar researches by Credé. Valenta says that, like Hecker, he has found changes both upon the long and transverse axis of the child, more frequent during pregnancy than during labour. His method of determining a breech-position during pregnancy he thus describes:—He lays his right hand flat on the fundus uteri, and then strikes the tips of the fingers as suddenly as possible towards the cavity of the uterus, against the part of the child lying at the fundus. By this manœuvre he has always succeeded in recognising the head by its peculiar hardness and evenness if lying at the fundus. He detects the head in oblique and cross positions in the same manner.

P. Müller ('*Monatsschr. f. Geburtsh.*,' 1865) relates a case in which, within five days, a complete version of the fœtus was effected six times.

C. Hecker ('Mon. f. Geburtstk.,' 1866) contributes a memoir on *the weight of the fœtus and its appendages in the different months of gestation*. These are some of his results:—The mean weight of fresh-born fœtuses at the 5th month was 284 grammes, of the putrid, 238 grammes, of the lipoid 157 grammes. In the 6th month, the mean of fresh fœtuses, was 634 grammes, in the 7th 1218, in the 8th 1569, in the 9th 1971, and in the 10th 2334 grammes. *The placenta*.—At the 5th month the placenta weighs 178 grammes, at the 6th 273, at the 7th 374, at the 8th 451, at the 9th 461; at the 10th 481. The maximum weights, however, much exceeded these. The placenta seems to acquire a gradual increase to the 8th month of about 100 grammes monthly. *The umbilical cord*.—The mean length was at 5th month 31 centimètres, at the 6th 37, at the 7th 42, at the 8th 46, at the 9th 47, at the 10th 51. Thus, the cord lengthens progressively with the age of the fœtus. There was a maximum length of 94 centimètres.

The form of the pelvis in different races of man has been examined by Dr. Joulín (see N. S. S. 'Year-Book,' 1864), and subsequently with better materials by Dr. Carl Martin, of Berlin ('Mon. f. Geburtstk., July,' 1866.) Having lived two years in Brazil, and examined many European museums, his observations refer to 800 cases. He concludes that—1. The pelvis of the European woman is the most roomy. The great pelvis is broader than in any other race, having the greatest distance between the anterior superior spines of the ilia, and also between the cristæ. The inlet is naturally transversely oval, the true conjugate diameter being smaller compared with the oblique and transverse diameters. The alæ of the ossa innominata are mostly translucent. 2. The pelvis of the negress is smaller, and especially narrower; its inlet is transversely oval, but the true conjugate is relatively greater than in European pelvises. The sacrum is broad and long. The alæ of the ossa innominata are mostly opaque. 3. The pelvis of the Bushman corresponds to the small stature of the entire body, and is smaller than in any other race. The alæ, in all specimens examined, were opaque. The ischia were, in proportion to the length of the cristæ of the ilia, pretty long, and higher than in any other race. The inlet is sometimes in a higher degree oval in the antero-posterior direction. 4. The pelvis of the Malayan of Java and the neighbouring islands is also narrow; it shows a small distance of the spines and crests in relation to the conjugate. The true conjugate is very long; the inlet is therefore very round, and in many specimens even oval antero-posteriorly. The alæ of the ossa innominata in all Java pelvises show large translucent spots. The ischia are relatively smaller. 5. The pelvis of the aboriginal of America is, on an average, little smaller than the European; the inlet is round, the outlet large, the ischia long. 6. The pelvis of the Pelasgian and Australian negresses shows a rather large distance between the spines and crests; a large true conjugate, a small transverse, and a moderate oblique diameter, and thus a somewhat round inlet. Of other races and families, Martin has not obtained measurements. The memoir is also deficient in information as to the comparative characters of the fœtal factor in parturition. Martin has not learned either from his transatlantic practice or his reading, whether the

remarkable variations in the form of the pelvis influences the mechanism of labour, especially whether the approach to the antero-posterior oval inlet brings the sagittal suture more into relation with the conjugate diameter. The coloured women in Brazil had labours neither easier nor more severe than European women. The plausible theory of Vrolik, that Javanese women bear easily children begotten by Javanese fathers, but not so those begotten by white men, is contradicted by the experience of Lehmann in Amsterdam.

The Relations of Pregnancy.

Dr. Mattéi discusses ('Gaz. d. Hop.,' 1865), *the influence of pregnancy upon the intellectual faculties of the woman*, and especially upon the responsibility of the pregnant.

Mr. A. B. Squire submits ('Med.-Chir. Trans.,' 1866) that lactation is an exciting and sustaining cause of *psoriasis*, and that the period occupied by pregnancy and its sequel, the puerperal state, is unfavorable to the manifestation of the disease.

Dr. Priou relates ('Bull. de la Soc. de Méd. d'Angers') a case of a woman, aged 72, who menstruated and aborted of a two-months fœtus three months before her death.

A case of menstruation during pregnancy is recorded by Dr. Graily Hewitt ('Obst. Trans.,' viii).

Dr. V. Saboia, of Rio de Janeiro, has published a memoir (1865) on *abortion*, considered from an obstetrical point of view.

Prof. C. Hecker ('Mon. f. Geburtsk.,' 1866) discusses the reactions between disease and the reproductive processes. Most chronic diseases, he says, are much aggravated by pregnancy, and often even hurried on to death. He refers to a previous treatise on the subject ('Hecker u. Buhl. Klinik d. Geburtsk. Leipzig,' 1861), and adds another illustration. The patient had swelling of the thyroid, impeding respiration. In her fifth pregnancy this rapidly increased; œdema of the legs and abdomen with albuminuria, appeared. Near the end of pregnancy she suddenly complained of dizziness of sight, and a sudden attack of dyspnœa destroyed life. Seven minutes after her death the Cæsarian section was made. The child's heart beat slightly, but it could not be restored. The uterus contracted to a ball after removal of placenta. Recent parenchymatous inflammation of the kidneys was found.

The tolerance of violence is illustrated by an amputation of the arm A. Napper ('Obstet. Trans.,' vii) without interruption to pregnancy.

A. Harris describes a membrane expelled from the uterus a few days before delivery at term ('Obstet. Trans.,' vii).

Dr. Rasch describes a remarkable case in which œdema of the lower half of the body occurred after a fall in the seventh month of pregnancy; premature labour; recovery ('Obstet. Trans.,' vii).

The *influence of zymotic diseases upon pregnancy* is illustrated by a case of abortion from variola in mother and child, related by Monier ('Gaz. des Hôp.,' 1865). The child had died some days before birth; it exhibited many variolous spots.

Cases of *rheumatism of the gravid womb* are related by Ed. Lobgeois ('Gaz. des Hôp.,' 1864), and Cöten ('Presse Méd.,' 1865).

Dr. Spengler ('Mon. f. Geburtsk.,' 1865) relates a case of *hemirralopia* in a pregnant woman. A healthy woman was seized suddenly with blindness in her fourth pregnancy. There was neither œdema nor albuminuria. She recovered her sight completely on delivery at term.

Mr. Hine relates ('Med. Times and Gaz.,' 1865) a very interesting case of *myelitis, with symptoms of chorea*, during pregnancy. The patient died, and a large quantity of turbid fluid was found in the spinal canal; in the middle of the dorsal region the spinal cord was softened, of creamy consistence. The cause of the disease appeared to be emotional.

Cases of chorea in pregnancy are recorded by Dr. Woodman ('Obstet. Trans.,' vii).

A case of *acute jaundice* during pregnancy is related by Dr. Barnes ('Lectures on Puerperal Fever,' 'Lancet,' 1865). The patient was a primipara, æt. 35. When five months gone she began to suffer from vomiting, blood and mucus being in the vomit; jaundice followed; great prostration; pulse 80; intelligence preserved; stools scanty, clayey; urine intensely icteric. Lethargy set in. The membranes were ruptured to bring on labour; the liquor amnii was deep yellow. Coma and convulsive twitchings followed, and death in about three days from the onset. The urine, examined by Dr. Letheby, contained leucine and tyrosine and lithates in large quantity.

V. Haselburg relates a case of *acute liver atrophy* during pregnancy ('Monatsschr. f. Geburtsk.,' 1865). The patient was admitted insensible. She was 39 years old; a cook at a restaurant. She had sought to conceal her pregnancy. Jaundice set in, and gradually increased in intensity, but she did her work for four days. Then vomiting of blood and epistaxis appeared. Next day she was found half conscious, undressed, her body on the bed, feet upon the floor, and a five-months foetus on the ground. Pulse small, over 120. Pressure on the region of the liver was so painful that the patient was aroused out of her stupor. On percussion the tympanitic resonance of the abdomen was divided from that of the lungs by only a narrow band. A little urine drawn showed with nitric acid the colours of gall-stuff, but no albumen. Collapse quickly set in, and she died two hours after admission. *Autopsy.*—Small extravasations were found in the kidneys. Liver small, weighing scarcely two pounds; extremely flaccid; the gall-bladder held only a little pale yellow gall. Sections showed uniform pale yellow colour, with extremely small and hardly recognisable acini.

Sir James Simpson ('Edin. Med. Journ.,' 1866) refers to three cases of fatal rupture of the spleen which occurred respectively during the pregnant, parturient, and puerperal states. As in states of morbid leucocythæmia, the spleen was often enlarged, so it was in pregnancy. Enlargement of the spleen sometimes recurred in successive pregnancies. In one patient of his the spleen became enlarged in a very marked degree, the enlargement always disappearing after delivery. A certain amount of softening frequently attends the hypertrophy, predisposing to laceration under muscular efforts or blows. A woman showed symptoms of fatal sinking shortly after labour at the sixth or seventh

month. Autopsy showed a laceration of the enlarged spleen, with effusion of blood into the peritoneal cavity. In another case the woman, after making some unusual exertion, a week or two after delivery, complained of abdominal pain and sinking, and died. Rupture of the spleen and effusion of blood were found. The late Dr. Cunningham delivered a patient by forceps. The patient died within an hour or two. Rupture of the spleen was discovered.

Rupture of the uterus in an early stage of pregnancy (Dr. Dickinson, 'Pathol. Trans.,' xvii, 1866).—In this case a young unmarried lady died suddenly after flooding. Post-mortem examination showed a pregnancy of three months; some blood in the peritoneal cavity; there was a large irregular rent, occupying about half the anterior aspect, reaching to the fundus. The os was wide enough to admit a finger; the vagina was somewhat dilated. No trace of an ovum could be found. A corpus luteum was found. The uterine structure was too much decomposed to permit of ascertaining whether it had undergone any morbid change. Suspicion existed that this was not a case of spontaneous rupture, but one of laceration by some criminal manœuvre, made with a view to procure abortion.

Retroversion of the pregnant uterus ('Edinb. Med. Journ.,' 1866).—Dr. Lorimer relates a case which ended fatally. The patient was about three months gone. Abortion was induced by the uterine sound, followed by ergot. Attempts before and after abortion to reduce the uterus failed. On autopsy the uterus was found completely retroverted, and a fibrous tumour the size of a small orange was lodged in the posterior wall.

A case is related by Dr. Briero ('Gaz. d. Hôp.,' 1866). A woman, æt. 36, was pregnant three months for sixth time, when she suffered a severe concussion from falling backwards. Pains and dysuria followed. The case being mistaken for prolapsus, a pessary was applied. The more severe symptoms—vomiting, prostration, retention of urine—came on. The uterus was returned by means of two fingers pressing upon the fundus uteri through the rectum. The woman recovered without aborting.

Dr. Playfair reports a case of retroversion at the fourth month; unsuccessful attempts at reduction were made. The uterus was finally replaced by fluid pressure by a caoutchouc bag filled with water, kept about twenty-four hours in the vagina ('Lancet,' 1866).

Abnormal Pregnancy.

B. S. Schultze insists ('Jenaisch Zeitung,' 1865) upon the distinction between superfecundation, *i. e.* the successive fecundation of several ova emanating from the same ovulation period, and superfoetation, *i. e.* the fecundation of a second ovum, the result of a later ovulation period, which quitted the ovary during an already existing pregnancy.

Superfecundation he believes quite probable. The supposed obstacle of the mucous plug in the cervix he denies. He says he has found spermatozoa in the catarrhal secretions of women six days after the last coitus, and contends that either by such spermatozoa, or by others

resulting from renewed coitus, the impregnation of a second ovum falling into the uterus is very possible. Superfœtation depends upon the following conditions:—1. During pregnancy an ovum must ripen and reach the uterine mucous membrane. That menstrual congestion often occurs during pregnancy is undoubted; menstrual bleeding also takes place; that a ripe ovum may reach the decidua can scarcely be denied, nor can the possibility of its being impregnated there. 2. The semen must be able to reach the ovum; the cervical mucus is no obstacle, and the route from the vagina to the Fallopian tubes is open until the decidua reflexa is consolidated with the decidua vera; this happens only after twelve weeks, so that, as Matthews Duncan has already shown, there is possibility of superfœtation in the first three months of gestation. And in *hydrops uteri gravidi profluens*, in which copious fluid secretion is thrown off by the mucous membrane, this route must remain open during the whole of pregnancy. And in uterus duplex subsequent fœtation may take place in the empty half. 3. In plural pregnancies the embryos often exhibit different degrees of development. These cases fall under two categories. 4. Embryos carried together have come to birth together, or within a short interval, their widely different development suggesting superfœtation. To this order belong the cases of simultaneous uterine and extra-uterine gestation. If an extra-uterine fœtus have died, a fresh uterine or extra-uterine pregnancy can take place, an event called *superfœtatio impropria*. To this order belong also those cases in which the unequal embryos are born quickly one after the other. Of these, both embryos have plainly been dead for a long time; and the changes in the bodies gives no indication as to the epoch of impregnation. Or, only the smaller embryo has been long dead; in such a case the difference of development is always attributable to the death of one during pregnancy. Or, only the larger embryo has been long dead; such cases are very rare. Knissmaul relates two. In both the uterus was double, and there was probably “*superfœtatio impropria*.” Or, both embryos may be born living, or dead, in very different stages of development. Such cases are very rare. The most striking is that of Dr. F. L. Meissner; the children, of which the first was immature, died during extraction, the other died twelve days after birth, being fourteen and a half inches long; they were contained in the same ovum, in the same chorion; they had thus the same starting-point of development, and might be regarded as an example of true superfœtation. Still more frequently it happens in triple births that one or two of the embryos imbedded in the same or in different ova have been retarded in development. The second category embraces the cases where contemporaneously carried embryos were born at long intervals without their difference in development answering to the difference of their periods of birth. From all, Schultze concludes that, although the possibility of superfœtation cannot be denied, the cases hitherto published do not establish the fact. See also a critical inquiry regarding superfœtation by Dr. G. L. Bonnar (‘Edin. Med. Jour.’, 1865).

Abnormal or ectopic gestation is illustrated in the following cases:

Dr. Depaul ('Gaz. Méd. de Paris,' 1865) comments upon a singular case of labour. The pregnancy was probably utero-interstitial. M. Parise, of Lille, believed that a foetus had been developed in an abnormal division of the uterus. At a meeting of the Academy of Medicine a report on the case was presented by M. Devilliers, who believed that M. Parise had been misled, and that what he had supposed to be an abnormal cavity was a pouch formed by the posterior lip and segment of the uterus. In the discussion M. Depaul, observing that he agreed with the report as to the incorrectness of the interpretation given by M. Parise, related the following case of utero-interstitial gestation which had come under his care.

He was called to Lille to see a lady, in whom labour had commenced twelve or thirteen days previously. The child, which had not been expelled, was dead and putrefied. A digital examination was attempted, but was desisted from on account of the pain which it produced. Recourse having been had to anæsthesia, the examination was repeated. M. Depaul now felt a hard cord, which he incised with a straight bistoury, and removed the foetus, the feet of which presented. The part which was divided consisted of the posterior circular fibres of the inner orifice of the cervix, which had become tense, hard, and hypertrophied, forming, by irregular development, a sac into which the foetus had entered.

Wiedersberg relates ('Vierteljahrsschr. f. prakt. Heilk.,' 1865) two cases. One of these cases Wiedersberg thinks must be regarded as an instance of ovarian gestation.

Spaeth relates ('Wien. Med. Presse,' 1866) a case of bilocular uterus, with migration of the ovum from the left ovary into the right cavity of the uterus.

Dr. Bley relates a case ('Gaz. d. Hôp.,' 1866) of the ordinary kind, with rupture and effusion of blood into the abdomen, ending fatally. The cyst was formed in the Fallopian tubes.

Mr. Turner, in a valuable memoir ('Edinb. Med. Journ.,' 1866) on malformation of the organs of generation, gives two cases of *uterus bicornis unicollis*. In both the left horn was rudimentary and pregnant. In one the pregnant horn ruptured; the foetus escaped into the cavity of the peritoneum. The parts were carefully dissected. In the other case the foetus was retained after the full period of utero-gestation. The preparation of the parts, which is in Sir J. Y. Simpson's museum, is minutely described.

Mr. R. W. Watkins relates ('Obstet. Trans.,' viii) a case of retention of a foetus in the abdomen for forty-three years. There had been signs of labour forty years before death. These passed away. She died at the age of seventy-four. Autopsy showed a mummified lithopædion connected by its umbilical cord to the placenta which was attached to the peritoneal covering of the broad ligament near the left ovary. The uterus was perfectly normal.

A case of like nature is recorded by R. Wagner ('Arch. d. Heilkunde,' 1865). A woman, aged 68, died suddenly. A lithopædion, or dermatopædion, was found in the abdomen. She had carried it twenty-nine years.

Cases of *extra-uterine gestation* are recorded by Dr. Junge ('*Monatsschr. f. Geburtsk.*,' 1865), by Dr. Boehr (*ibid.*), by Professor Martin (*ibid.*) In Martin's case the nearly full-grown fetus, which had been retained about three years, was partly expelled and partly extracted through the abdominal walls. The woman recovered. By Philippart ('*Gaz. d. Hôp.*,' 1865), by Pellischek ('*Oesterreich. Ztschr. f. prakt. Heilkunde*,' 1865). In this case extra-uterine gestation was complicated with uterine gestation. Having delivered the uterine fetus, in removing the placenta Pellischek felt another living child in the left hypochondrium. It was determined not to interfere. A year later the mother was quite well, and the tumour had much diminished.

Dr. J. R. Marinus has furnished to the Brussels Society of Med. Sc. ('*Journ. de Méd., &c., Bruxelles*,' 1866) a systematic memoir on extra-uterine gestation, which sums up the current knowledge of the subject.

The following case is recorded ('*Med. Times & Gaz.*,' i, 1865) as occurring in the practice of Dr. Friedrich, of Heidelberg. A woman, aged 19, had a tumour in the line of Poupert's ligament. This increased in size, and was diagnosed to be an extra-uterine gestation. To obviate rupture Friedrich injected into the tumour through the vagina $\frac{1}{10}$ grain of morphia on four occasions. The tumour shrank, the catamenia returned, and the patient recovered.

Cases of extra-uterine gestation are reported by Dr. Playfair ('*Obstet. Trans.*,' vii.) by Dr. Braxton Hicks (*ibid.*), by E. B. Truman (*ibid.*). In the discussion upon the latter case (*ibid.*) Dr. Barnes called attention to a point in the physiology and diagnosis of early tubal gestation. Previously to the rupture of the cyst—that is, previously to the shock and collapse which mark the epoch of the rupture—it was usual to observe a discharge of blood per vaginam. The hæmorrhage, he believed, was commonly produced in this way:—The ovum growing, at about two or three months, the period when chorion is rapidly forming placenta, the rate of growth of the villi greatly exceeds that of the sac. The Fallopian tube is unfitted to harbour the ovum; it cannot keep pace with the shooting out of villi. These become disturbed; hæmorrhage results. Thus, under combined distension from growing ovum and hæmorrhage, rupture takes place. It was by a perfectly analogous process that hæmorrhage took place in placenta prævia. Here is an *error loci*, as in tubal pregnancy—the ovum grows in the wrong place. The cervical zone is not well adapted to grow with the growth of the ovum. Hence a time arrives, about the fifth or sixth month generally, when the shooting villi get detached from the uterine wall, and hæmorrhage results. The cases of tubal gestation and placenta prævia were strictly analogous in this respect. Both were examples of ectopic gestation—the ovum growing in a structure not fitted to grow in proportion with it. Mr. Roper remarked that in two cases he had seen ruptures of the cyst took place at a menstrual epoch.

Other cases are reported by Eckhardt ('*Monatsschr. f. Geburtsk.*,' i, 1865). There was decomposition of the fetus, discharge of a part through the bowel, and death by exhaustion. By Hillmann ('*Berlin. Klinische Wehnschr.*,' 1864). The subject had been delivered of a

former child by Cæsarian section; the child died at eight months, and was ultimately discharged by a suppurating opening between the navel and symphysis. The woman recovered.

Dr. Sadler records ('Med. Times and Gaz.,' 1865) a case under the following title:—Tubal gestation; true corpus luteum in the ovary of the opposite side; death by rupture of the sac.

Reference is also made to a collection of cases published in various journals during 1864 (see 'Schmidt's Jahrb.,' 1865).

Two cases are related by Dr. Baeza ('Siglo Medico,' 1865). After symptoms of pregnancy irritative fever set in. A fistulous opening made its appearance in a tumour under the navel. The skull of a foetus presented at the opening. This was drawn out by the patient; but a cloaca remained, out of which were discharged excrements, urine, and blood. This went on for a long time, the woman returning to work. At length, great exhaustion ensuing, she went to the hospital. An incision was made, and the foetus, reduced to a skeleton, was extracted. Into the cyst fistulous openings existed, communicating with the small intestines. Recovery took place, and the urine and faeces resumed their natural passage. The next case also resembles extra-uterine foetation, or, possibly, it is an instance of *missed labour*. A woman, aged 42, had several children normally. Again pregnant and near term, she felt symptoms of labour, which passed away. A month later pains again set in, with great distress in breathing. An offensive discharge took place from the vagina, and the size of the abdomen diminished. Three months later the discharge ceased, but some foetal bones escaped from the vagina. A hard swelling remained in the abdomen. Much irritative fever. Some offensive pus came from the os uteri. Gastrotomy was performed seventeen months from presumed date of conception. Air was contained in the cyst. The foetus was exposed and extracted. Injections of water were thrown into the cyst to cleanse it; none of this made its way through the os uteri. The cyst was irregular, having several pouches, one of which communicated with the uterine cavity. The patient recovered.

Sir James Simpson relates ('Edin. Med. Journ.,' 1865) a case of *missed labour*. The patient passed the expected time of labour without pains setting in. Three months after, the placenta was discharged in a putrid state. The sound introduced into the uterus struck some bones. Vomiting and collapse and death ensued. On dissection a foetus in breech-position, gone into fatty metamorphosis, was found. The uterus was adherent in front to the abdominal walls, behind to the intestines. There was an opening the size of a half-crown between the transverse colon and the uterine cavity. The uterine walls were as thin as parchment.

III. LABOUR.

The late Dr. Ch. G. Ritchie contributed ('Med. Times and Gaz.,' i, 1865) a memoir on *the mechanism of labour in cranium-presentations*. For the sake of description he divides the mechanism of the first cranial position into six steps. 1. Flexion:—2. First movement of descent.

3. Levelling or adjusting movement. 4. Rotation. 5. Second movement of descent and extension. 6. External rotation. He explains flexion as happening in the following manner:—It depends upon the head being articulated nearer the occiput than the face. Every part of the head is equally pressed upon from below by the resisting structures, but the sum of pressure in front of the spinal column is greater than the sum behind, and the head rotates. Ritchie denies the truth of the theory that flexion is due to pressure propagated downwards by the vertebral column. 2. The first movement of descent is due to the expulsive action being exerted downwards and backwards in the direction of the axis of the brim; hence the head descends in that direction till the occiput reaches the lower part of the foramen ovale. 3. As the sinciput has to travel further than the occiput, so has the left side of the head to travel further than the right; the head, therefore, does not undergo simple extension, but a double or oblique movement. The head rotates on its transverse axis, and also towards the right shoulder. The cause is that the occiput now experiences the greater resistance, and therefore is the more fixed point. 4. The rotation, *par excellence*, is that of the head upon its perpendicular axis. The occiput at every pain seems to make an effort to pass behind the ascending branch of the ischium, whilst the face is invited into the free hollow of the sacrum. The head escapes, as Leishman and others show, somewhat obliquely. 5. The head having rotated, the occiput is placed just behind the arch of the pubes. The head now begins to extend. 6. The rotation of the shoulders, like that of the head, is imperfect. The right shoulder is lowest, and takes the place of the occiput.

Dr. W. Küneke ('Mon. f. Geb.,' 1866) disputes the reality of the bi-parietal obliquity of the head described by Naegele. His essay seems to be based upon Dr. Leishman's work.

Dr. Barnes illustrates by outlines ('Obstet. Trans.,' vii) the varieties of form imparted to the foetal head by the various modes of birth. He draws the following deductions from his diagrams. The ordinary dimensions of a standard head at term not deformed by labour are—fronto-occipital diameter, 4'50" to 5'00"; occipito-mental diameter, 5'25" to 5'50"; greatest transverse diameter (between parietal protuberances), 5'75" to 4'00"; lesser transverse diameter (between the ears), 3'50". He observes that the measurements commonly given in books are taken from averages of observations made upon children after ordinary labour, in which probably some deformation had occurred. 2. In protracted labour, with vertex presentation, in a pelvis normal, or nearly so, the above dimensions are altered to—fronto-occipital diameter, 5'25" to 6'00"; occipito-mental diameter, 6'50" to 6'75". The greatest transverse diameter is often merged in the lesser, that is, the parietal bones are compressed so that the inter-parietal diameter becomes the same as the inter-auricular, which is fixed. 3. That in a case of tedious labour, with the head in the third position of Naegele, the elongation is greatest in the bregmato-mental diameter, that is, the elongation more nearly approaches the vertical diameter than the longitudinal. 4. That elongation of the head is due sometimes entirely, and often greatly, to the pressure the head experiences in passing a rigid, imperfectly dilated

cervix uteri. Hence the conical elongation is most marked in primiparæ; hence also one reason why the forceps is so much more frequently called for in first labours. 5. That in turning in contracted pelvis, from projecting promontory, the transverse flattening of the head is much exaggerated; that in extreme cases, the moulding capacity of the cranial bones being exhausted, space is gained by indentation or even by fracture of the bone in contact with the sacrum; that the lateral or transverse compression is compensated by slight mento-occipital elongation, *i. e.* this diameter increases a quarter or half an inch, and also by fronto-occipital elongation.

Dr. Inglis, discussing ('Edinb. Med. Journ.,' July, 1865) the means of facilitating the first stage of labour, divides labours into "wet" and "dry." In the first there is free mucous secretion, and the cervix dilates easily. These advantages are due to detachment of the membranes from the lower segment of the uterus. Hence he recommends the artificial separation of the membranes in cases of "dry" labour, and in all cases of induction of labour. It can often be done with the finger. If an instrument is required, Dr. Hamilton's bolt is best.

Dr. Hardie, discussing ('Edinb. Med. Journ.,' Dec. 1866) the management of the second stage of labour, supports the modern doctrine that art may usefully intervene in a certain number of cases to shorten the second stage of natural labour. He greatly extends the use of the forceps. In 100 cases he applied this instrument in 28, under the indication to abbreviate anxiety and pain.

Dr. Thorburn ('Med. Times and Gaz.,' 1866) advocates, the more extended use of the forceps for the purpose of shortening labour.

Ergot.—Dr. Dyce Brown ('Med. Times and Gaz.,' 1865), seeking to avoid the inconvenience resulting from the too violent action of ergot when given in the ordinary doses, has tried and recommends small doses—five grains. A single dose, he says, will often excite moderate but sufficient pains.

Dr. Winckel, of Rostock ('Mon. f. Geb.,' 1865), has made careful observations upon the influence of *chloroform* upon labour. He concludes—1. That chloroform-narcosis retards labour by prolonging the intervals between the pains. 2. The acme of the pains is also shortened. 3. The effects soon pass off; hæmorrhages are only observed in abnormal labours, and not in labours with normal pains. 4. In crampy pains chloroform only allays the suffering without regulating the contraction. 5. Chloroform-narcosis does not exert perceptible influence upon the temperature, either in normal or abnormal labour.

Dystocia by the Fœtus.

Dr. Wolff relates a case ('Berl. Klin. Wehnschr.,' 1866) of dystocia from enlarged kidneys in the fœtus.

Dr. Curret ('Ztschr. f. Med. Chir. u. Geburtsh.,' 1866) relates a case in which labour seemed arrested by cadaveric rigidity of the fœtus.

Dr. Braxton Hicks ('Obs. Trans.,' vii) describes 2 cases of labour with face-presentation in the mento-posterior position, and discusses

the mechanism of this kind of labour. In some very rare cases he shows that the chin does not rotate forwards, but remains posterior, and may be delivered in this way, the chin sweeping the perinæum, but that it will most likely require artificial aid. It may be possible to rotate the chin forwards by the forceps; and failing that, to draw the head down in that manner which may be found most practicable, that is, with either the forehead and vertex first, or the chin.

Dr. Hildebrandt ('Mon. f. Geb.,' 1865) relates two interesting cases of persistent forehead-presentations which illustrate this subject.

Evolution spontaneous—Mr. G. H. Furber relates ('Brit. Med. Journ.,' Dec. 1864) a case of spontaneous withdrawal of the arm, and cephalic birth.

Dr. Ad. Samelson relates a case of delivery during sleep ('Brit. Med. Journ.,' 1866).

Dr. v. Franque ('Wien. Med. Presse,' 1866) relates 5 cases of spontaneous evolution. In 1, a living child being born by head, a second presented by left shoulder. Whilst preparing to turn, strong pains set in, and the breech came down. The membranes were then ruptured. The child was born weakly, and soon died. In 2, a primipara, the left arm prolapsed. Several hours later the breech was at the outlet, and extraction was completed by forceps. Child alive. In 3, the arm and funis prolapsed, and the presentation changed to a partial footling. Child dead. In 4, a primipara, transverse presentation, elbow and hand were felt through the membranes. Strong pains lasted for five hours, the os uteri not being open enough for turning. Then the membranes burst, and a foot was felt. It was a footling delivery. The child lived. In 5, a primipara, there was partial placenta prævia, the back and prolapsed arm also presenting. The bleeding being considerable, plugging was practised. Half an hour later, on removing the plug, there was a complete breech-presentation. The child was extracted alive.

Dr. Graily Hewitt records a case of twins, one of which, presenting by the arm, was delivered by spontaneous expulsion alive. The child was small in proportion to the pelvis ('Lancet,' i, 1866).

Reference is made to the following:—On the mechanism and management of delivery in cases of double monstrosity. Dr. Playfair ('Obstet. Trans.,' viii).

A difficult labour from double monstrosity; decapitation. Breslau ('Mon. f. Geb.,' 1865).

Case in which the right arm of the child was extruded through the anus during labour. Dr. Eastlake ('Obstet. Trans.,' viii).

Dr. R. Dyce ('Med. Times and Gaz.,' ii, 1866) gives cases of the successful treatment of prolapse of the funis by the prone posture of the patient. The cord was first carried back into the uterus by the hand, and the patient kept on her face until the head entered the pelvis. Mr. N. Adams (ibid.) records another case, also successful.

Dystocia by the Mother's Soft Parts.

Mr. George Roper ('Obstet. Trans.,' vii) discusses the course of labour in primiparous women late in life. He says that, contrary to

what is assumed, there is in such cases an absence of that rigidity and tenacity of structure met with earlier in life. The soft parts about the outlet of the pelvis are thin, flabby, elastic from want of tone, and offer but a feeble resistance. Hence an explanation of what is often observed, that first labour late in life is not severe or protracted.

Mr. Roper ('Obstet. Trans.,' vii) describes a case of difficult labour owing to hypertrophy of the cervix uteri. The os came down to the vulva, the cervix being the whole length of the pelvis. It was necessary to perform craniotomy. In a previous labour she had been delivered by Dr. Barnes, there being then the same difficulty from the elongation and hypertrophy of the cervix, and, in addition, a soft pelvic tumour. The woman died of pyæmic fever.

Dr. Breslau relates ('Mon. f. Geburtsk.,' 1865) a case, and gives references to others, of prolapsus of the gravid womb. It was necessary to incise the cervix uteri and to perforate the child.

Dr. H. Hildebrand ('Konigsb. Med. Jahrb.,' 1865) relates his experience in incising the os uteri when its rigidity obstructs labour.

Dr. Greuse gives ('Mon. f. Geburtsk.,' 1865) a case of labour obstructed by a complete hymen, which had to be incised.

Dr. Berry, of Birmingham ('Obstet. Trans.,' viii), relates two remarkable cases of dystocia from tumours. He instanced a case of obstruction by an ovarian tumour, in which the child had been, with considerable force, delivered by the forceps. The next day, after coughing, the patient felt something descend. Dr. Berry was then called in, and, on examination, found it to be an ovarian tumour, the pedicle of which was traced through a rent in the upper part of the vagina. Opiates were given; and, two days afterwards, a ligature was put round the pedicle, which was then cut through just below. The patient recovered without very anxious symptoms, and was about again at the end of the month. She has also been delivered since, and without any trouble. In the other case there was a soft tumour springing from the sacrum, which reduced the antero-posterior diameter to about two inches. This was explored by trocar; but nothing but blood flowing, it was debated whether Cæsarian section should be performed or not. It was ultimately agreed to perforate. This was done, and the fœtus then turned. Very great difficulty occurred; but at last it was accomplished. The patient, however, died afterwards from rupture (as it subsequently appeared) of the uterus.

Dr. Berry pointed out the inferences to be gathered from these cases:—That, in the first, the tumour should have been tapped before the use of forceps; and, in the latter, the Cæsarian section would have been probably much the safer treatment.

Dr. A. Hall related a case similar to the last one, where version had been adopted, and rupture of the tumour, with internal hæmorrhage, caused death shortly afterwards.

The complication of *pregnancy with tumours* is illustrated in a series of cases by Dr. Greenhalgh ('Bartholomew's Reports,' i). One is a case of thrombus of the left labium, 4 are cases of ovarian tumours, 3 of fibrous tumours of the uterus, 1 of hypertrophy of the neck of

the uterus, 1 of epithelioma in the rectum, 1 of cancer of the left kidney, and 4 are cases in which uterine was complicated with extra-uterine pregnancy.

Large steatoma of the uterus in a pregnant woman. Ostertag ('Ztschr. f. Wundärzte u. Geburtsk.,' 1865). The patient had suffered from repeated hæmorrhages during pregnancy, and copious flooding attended labour. After birth the uterus retained its bulk. Attempt was made to detach the placenta; but owing to the interposition of the tumour, this could not be done. On the fourth day very foul discharge began, under which the woman quickly sank. *Autopsy*.—The uterus had undergone steatomatous degeneration from the left edge of the os uteri as far as the fundus, and across as far as the upper third of the right wall downwards. At the fundus it was three inches thick, and there were three or four outgrowths projecting on the outer surface. The placenta adhered over an extensive surface by vascular connections that could not be separated. Its surface had passed into purulent degeneration. There were several melanotic knots in the mass of the steatoma. The weight of the uterus was ten pounds.

A case of pregnancy, complicated with a tumour occupying nearly the entire pelvis. Dr. Beatty (1866).

A case of fibrous tumour of the uterus attended by early pregnancy; retroversion of the uterus and retention of urine; death and decay of the fœtus, and subsequently death of the mother from pyæmia. Dr. Hall Davis ('Obstet. Trans.,' vii, 1865).

Prof. Breslau relates ('Mon. f. Geburtsk.,' 1865) a case of uterine fibroid complicated with pregnancy. The tumour filled the pelvis, and was immovable, leaving only a narrow space behind the pubes where the finger could pass. It was necessary to resort to Cæsarian section. The child was saved. The uterus contracted, but did not sink into the pelvis. It was infiltrated with large and small tumours. She died twenty-two hours after the operation. Prof. Breslau refers to 4 cases in which labour passed without special difficulty and, indeed, well; to 7 cases without difficulty in labour, but with unfortunate result, either immediately afterwards or during childbed; to 5 cases in which the fibroid obstructing labour could be replaced; to 9 cases in which reposi-tion did not succeed, was not attempted, or did not appear called for, but in which operative assistance was necessary; to 8 cases in which Cæsarian section, either at once or after other operations had failed, was resorted to, all the mothers dying; to 3 cases in which the mothers died undelivered.

Hecker ('Mon. f. Geburtsk.,' 1865) replaced a large uterine fibroid growing from the posterior wall, and then was enabled to deliver by forceps. The patient recovered. In another case the patient gave the idea of a large uterus bicornis; there was a deep depression at the fundus. In either enlargement there was an elastic feel, simulating child and liquor amnii; both contracted with each labour-pain, and on either side the fœtal heart was heard. A seven-months child was delivered by turning on account of prolapsus of the cord. Bleeding followed, and, twin-pregnancy being still suspected, the hand was introduced, when a large tumour was felt. On the third day the tumour

rapidly enlarged, vomiting and prostration set in, and death followed on the sixth day. Peritonitis was found.

Dr. Spiegelberg relates two cases of fibroids complicating pregnancy ('Monatsschr. f. Geburtsk.,' 1866). The first was a case of interstitial fibroid in the right side of the lower segment of the uterus. Premature labour occurred. The child, in a macerated condition, presented by the breech. During expulsion the tumour was flattened down, and resumed its rotundity afterwards. No hæmorrhage or puerperal disorder ensued. The second case was one of large interstitial fibroid of the fundus. Premature labour; breech; flooding. Peritonitis came on from suppuration around the tumour and in it, with endometritis. Death took place from ulcerative endocarditis of the aortic valves. Endocarditis set in on the fifteenth day, marked by strong rigor. Sixteenth day, again rigor, and œdema of the face and feet; a systolic bruit, with very strong second sound; diarrhœa; conjunctivitis of the right eye, with small hæmorrhages; keratitis and exudation in the interior chamber; next day, similar events in the left eye, the urine became albuminous, and the patient died on the thirtieth day. Dissection showed pus in the sterno-clavicular joint; eight ounces of clear fluid in the pericardium; small ecchymoses on the heart's surface; the aortic valves thickened, swollen, and rough, the substances easily crumbling down; in a large arterial branch of the lower lobe of the right lung was a greenish fragile embolus, which extended into the neighbouring branches.

Dr. Hugenberger describes the cases of *puerperal effusions of blood into the cellular tissue* observed in St. Petersburg ('St. Petersb. Med. Ztsch.,' 1865).—1. Perineal hæmatoma before labour; consecutive abscess opened by the knife; perforation of the rectum; recovery. 2. Labial hæmatoma apparently arising during labour; twins; normal contraction of the second; suppuration of the burst blood-gathering; pyæmia and death. 3. Labial hæmatoma before labour; suppuration of the burst gathering during childbed; fatal metro-peritonitis and pyæmia. 4. Labial hæmatoma during labour; bursting; recovery. 5. Labial hæmatoma during labour; incision; recovery. 6. Ditto. 7. Ditto. 8. Perivaginal hæmatoma after labour; spontaneous bursting; recovery. 9. Ditto. 10. Peri-uterine hæmatoma during labour; narrow pelvis; violent labour-pains; fatal hæmorrhage. 11. Peri-uterine hæmatoma after labour, with cross birth and turning; bursting of the sac, and death by bleeding into the abdominal cavity.

Dystocia by the Pelvis.

On the management of cranial presentations in contraction of the pelvis from rickets. By Prof. E. Martin. ('Berl. Klin. Wchnschr.,' 1866).

The causes and mode of formation of the oblique or unilaterally contracted pelvis are elaborately investigated in a prize essay by Dr. A. Otto ('Mon. f. Geb.,' 1866).

Dr. A. Valenta ('Mon. f. Geburtsk.,' 1865), adverting to the essay of

Prof. Litzman on the obliquely contracted pelvis, relates two cases which came under his own observation.

Dr. Marinus ('*Presse. Méd.*,' 1865) relates a case of *narrowing of the pelvis through exostoses*. Craniotomy was performed successfully.

Dr. G. Hartmann ('*Mon. f. Geb.*,' 1865) relates a new case of *spondylolisthesis*. Labour was brought on prematurely with success for mother and child. (For history of this pelvic distortion see N. S. S. 'Year-Book,' 1864.)

Six cases of *osteomalacia* are related in the 'Report of the Milan Lying-in-Hospital.' The usual symptoms of pains and impossibility of standing erect were present. The only circumstance Dr. Casati calls attention to is that all the patients came from the flat district of Milan, where misery prevails. Nearly all were weavers in cotton, and were badly fed with a scanty allowance of maize bread. Not one came from the highest parts of the city or from the Lago Maggiore.

The Forceps.

Dr. Putégnat has communicated to the Society of Med. Sciences of Brussels ('*Journ. de Méd., &c., Brux.*,' 1866) a memoir on *the limits of the tractile force exerted by the forceps* in relation to the mother and the child. He refers to the researches of Baudelocque and of Delore ('*Gaz. Hebdom.*,' 1865). Delore, in experiments on the dead body, carried traction to a force equivalent to 200, 250, and 270 kilogrammes, without injuring the pelvis. In numerous labours, Putégnat says, he has been aided in traction by 1, 2, and, in one case, by 5 assistants, all taking a point of resistance. In no case was the pelvis started or fractured. He concludes, with Delore, that—1. Movements of laterality, judiciously applied, permit the extraction of the fœtus most easily, and with the least danger to mother and child. 2. The solidity of the pelvic symphyses is generally much greater than the resistance required in traction exerted according to the rules of art. 3. The pelvis is endowed with an enormous power of resistance, and pregnancy does not diminish this power. If, therefore, the symphyses are ruptured, this must be attributed to congenital or morbid weakness. As to the degree of force which the child can bear, Putégnat starts with the proposition that the pressure exerted upon the head is in proportion to that of the traction upon the handles of the instrument. Delore says when he exerted a tractive force of 130 kilogrammes the head was not cracked, but when the force was 140 kilogrammes it was always broken. Putégnat confirms this. Essays upon this subject and upon the *appareil à tractions continues de Chassagny* have been published by Berne (Lyons, 1865) by Jacquemet (Montpellier, 1866) and on the use of force in labour by Bailly (thesis, Paris, 1866). This last embodies some of the views of Joulin, who contests with Chassagny the merit of priority and of excellence in the application of graduated force to the forceps by machinery.

The Milan school follows the precepts of Lovati in the use of the forceps; that is, the blades should always be applied to the sides of the head, for the reason that in so applying them the bi-parietal diameter of the head is reduced, as it is naturally reduced in normal labours.

Ferd. Weber has examined by experiments the uses of *cephalotripsy* ('Wien. Med. Press,' 1865). He concludes—1. That by no instrument was it possible to break the bones of a perforated head; they were only bent. 2. Even when the brain is well removed the bones can only be bent. 3. The shortening of the diameter effected by the cephalotribe is compensated by lengthening of other diameters. 4. By no cephalotribe is it possible to completely excerebrate a perforated skull; generally only about half the brain is evacuated. 5. A perforated and excerebrated head may be compressed to a greater degree than one not so treated; in the case of one not perforated the blades of the strongest instruments are somewhat bent. 6. By no instrument can the head of a mature child be so grasped that the points of the instrument will touch.

Reference is made to *decapitation* of the fœtus in a paper by Dr. W. Küneke ('Mon. f. Geb.,' 1866).

Cæsarian Section.

Two cases are recorded by Dr. Fayrer (Churchill, 1866, London).

Dr. Wasseige, of Liège, describes modifications ('L'Union Méd.,' 1866) in the operation. Instead of quickly closing the wound, in order to arrest hæmorrhage, Wasseige gave three doses of ergot first, the wound not being united for half an hour. In this manner he obviated bleeding into the abdominal cavity. The woman had peritonitic symptoms, but perfectly recovered.

See cases by Dr. Natali Zoja ('Annal. Univ. di Med.,' 1865); Dr. Ender ('Mon. f. Geb.,' 1865), Dr. Greenhalgh ('Med. Times and Gaz.,' 1866), Dr. Richardson's ether-spray was used; another by Dr. Greenhalgh ('Lancet,' 1866), W. Hardin ('Lancet,' 1865), Hall Davis and De Morgan ('Lancet,' 1865), Dr. Newman ('Obst. Trans.,' viii). Post-mortem Cæsarian section was performed by Mr. Hulke ('Brit. Med. Journal,' 1866).

Dr. Greenhalgh read a paper ('Obst. Trans.,' viii) on the comparative advantages of Cæsarian section over craniotomy in extreme distortions of the brim. After analysing the cases on record and his own, he considered that craniotomy should not be attempted where the effective antero-posterior diameter was less than two inches, considering the chances for the patient better under Cæsarian section. In the discussion which followed, Dr. Barnes showed a seven months' fœtus that he had drawn through a very deformed pelvis—having only an inch conjugate diameter—by the craniotomy forceps, bringing by it the face to present. He had quite recently delivered, with complete success, a lady in the country similarly deformed.

Accidents during Labour.

Rupture of the Uterus.—A case of rupture of the uterus is recorded ('Annal. Univ. di Med.,' 1866) in the report of the Milan Lying-in-Hospital. The head was in the first position; uterine action irregular; dilatation incomplete. During a strong expulsion pain the patient complained of acute pain in the left side, followed by general prostration and arrest of labour. No escape of blood. The feet were found at the fundus; child extracted dead, of full size. The woman died in twenty-four hours. *Autopsy.*—Blood in iliac cavity, plastic puriform

effusion on intestinal peritoneum. The rent extended from the anterior wall of the vagina through the neck of the uterus. The placenta was attached at the fundus. The pelvis seemed well formed. The factors concerned in the rupture were the thinness and resistance of the inferior segment of the uterus, large size of the child, irregularity of contractions, and the violent willful bearing down. See cases by Dr. A. Simpson ('Glasg. Med. Journal,' 1866); Dr. Whinery ('Amer. Journ. of Med. Science,' 1866); F. Cox, two cases ('Brit. Med. Journ.,' 1866); Dr. Sucro; Dr. E. Kormann ('Schmidt,' 1866); Dr. S. Dyer ('Brit. Med. Journ.,' 1865); Dr. Schwahn ('Mon. f. Geb.,' 1866); Dr. Martin (ibid.); Dr. Germann (ibid.); Dr. Poppel (ibid.); Dr. Ad. Senfft ('Wurzb. Med. Ztschr.,' 1865); Dr. O. v. Franque ('Wien. Med. Presse,' 1865); Dr. Datton ('Lancet,' 1866); Dr. Binant ('L'Union Méd.,' 1866), a case in which the uterus was torn (malapraxia).

Dr. McClintock ('Dubl. Quart. Journ. of Med. Science,' 1866) draws a parallel between lacerations of the uterus and *lacerations of the vagina*. See also Dr. Sanger ('Nederl. Tijds. v. Geneesk.,' 1865), Dr. v. Grünewaldt ('Petersb. Med. Ztschr.,' 1865).

An important memoir, by Dr. Radford, is found in the 'Obstet. Trans.,' viii. The author related minutely the history of nineteen cases which had fallen under his notice. Of this number in eleven the ages registered were from 21 to 40 years, and it was found that the accident occurred more frequently between the ages of 39 and 40. The number of labours which each woman had undergone varied from the first to the eleventh; and it was shown that laceration of the uterus happened most frequently in women pregnant for the eighth time, and that in primiparæ the accident took place quite as often as it did in any of the other cases which were registered. The duration of the labour, from its commencement to the occurrence of laceration (though in some cases not exceeding three or four hours) was generally from ten to thirty hours. Of the various causes or conditions mentioned as producing laceration, slight contraction at the brim of the pelvis appeared to have been the most frequent. The author considered that when the form of the pelvis was only slightly contracted, the os and cervix uteri partially descended during labour into or a little through the aperture of the pelvis, so that, as the head of the infant was forced down, the uterine tissues became fixed between this body and the pelvic bones. The fixity of this structure actually formed a "*point d'appui*" from which the uterine fibres during contraction forcibly pulled; and the great probability was, that sooner or later the tissue either directly tore or, being first contused and softened, yielded. As regarded the situation of the laceration, the cervix uteri was the part most frequently affected, and sometimes with it the body of the organ was also implicated. In eleven cases the laceration was longitudinal, in three transverse, in three oblique, and in one circular. Of the nineteen cases, three recoveries took place. Radford observed that when we contemplated the frequent fatality of laceration of the womb, we were led to inquire whether there were no symptoms which showed themselves as universal precursors of this dreadful catastrophe; and if there were, were we possessed of the means of prevention? In all the cases he now brought

before the society there could not be found any with premonitory symptoms which of themselves would warrant any operative measures being taken in order to avert the impending danger.

A case of labour in which *fracture of the pelvis* occurred is recorded by Dr. Van der Espt ('Journ. de Méd. Brux.,' 1866).

Inversion of the uterus is illustrated in the following:—Dr. Sidey ('Edin. Med. Journ.,' 1866), Dr. Denham ('Dubl. Quart. Journ. of Med.,' 1866), Dr. Praël ('Mon. f. Geb.,' 1865), Dr. Courty ('Gaz. d. Hôp.,' 1866), Dr. Mattéi (ibid.), Dr. Clemens ('Wurzb. Med. Ztschr.,' 1865), Dr. Casati ('Annal. Univ. di Med.,' 1866), Dr. Ogle ('Pathol. Trans.,' 1866), Dr. G. Möller ('Mon. f. Geb.,' 1866), Dr. Marion Sims ('Obstet. Trans.,' vii), E. Clemensen ('Hospital Tidende,' 1865).

Hæmorrhage.—Dr. D. W. Parsons ('Med. Times and Gaz.,' 1865) relates a case of flooding, in which contraction was caused by electro-magnetism. Dr. J. G. Wilson ('Glasgow Med. Journ.,' 1866) effected contraction by the ether-spray. *Prolapsed placenta*.—See cases by P. Müller ('Wurzb. Med. Ztschr.,' 1866), Dr. Sinuts ('Obstet. Trans.,' viii). *Placenta prævia*.—See a remarkable case by George Roper (ibid.). *Retention of placenta*.—See F. Howitz ('Bibliotek f. Læger,' 1866), Dr. Baumgartner ('Rev. Thér. Med. Chir.,' 1865). *Accidental or concealed hæmorrhage*.—J. T. Mitchell, R. Dunn, R. Greenhalgh, Dr. Brunton ('Obstet. Trans.,' viii). *Transfusion of blood*.—Prof. Simon Thomas relates a case ('Schmidt's Jahrb.,' 1865). See also Drs. Aveling and G. Hewitt ('Obstet. Trans.,' vii).

Puerperal Eclampsia.

Cases of puerperal convulsions successfully treated by the inhalation of chloroform are reported by Dr. James Cutbill ('Edin. Med. Journ.,' 1865).

Dr. Cairns relates ('Edin. Med. Journ.,' Feb. 1866) a case of convulsions apparently due to shock and hæmorrhage. A primipara was affected with partial right hemiplegia. At times hæmorrhage occurred. Pains were weak, and had no influence on the os uteri. The membranes were ruptured. Labour on, but in four hours a convulsive fit occurred. No œdema, no albumen in the urine. Several fits. Live child delivered by long forceps. The placenta was found to contain a rupture near the centre. She ultimately recovered.

Dr. Putégnat contributes ('Journ. de Méd., &c., Bruxelles,' 1866) a memoir on eclampsia. He relates six cases. Four were primiparæ. In one the convulsions appeared before labour, in one during, and in two after labour. Three died; one before, one during, one after labour. One was killed by a single attack, one died undelivered. Not one of the six had œdema. In three cases the urine was examined; in one only was much albumen found, in one there was a slight cloud, in one nothing. In the case of a single girl, æt. 19, who had been delivered without accident, violent emotion was caused by the visit of her lover, promising marriage, and again by the reproaches of her parents. The attack followed this. The urine was not examined. She died in epileptic eclampsia. In another case, in which the eclampsia broke

out after an easy labour, the child subsequently gave evidence of syphilis, and the mother was chloro-anæmic. Her urine was not examined. She got well.

In the 'Report of the Milan Lying-in Hospital' are 7 cases of puerperal convulsions. These 7 cases occurred in 554 women. All were treated by free bleedings. All the cases had been for some time in hospital. Six were primiparæ. Six living children were born. Albuminuria was noticed in 4 cases only. Of these one only was anasarcaous, the woman bearing twins.

Dr. Lazzati notices that a position on the right or left side, with the legs and thighs bent, was almost constantly assumed between the fits.

Dr. Greuser relates ('Mon. f. Geburtsk.,' 1865) a case of œdema in a primipara aged 20; much albumen in urine; no eclampsia. The albumen gradually disappeared as the milk came after labour.

Dr. Barnes (in "Lectures on Puerperal Fever," 'Lancet,' 1865) discusses albuminuria and convulsions. He says these are most frequently conditions of pregnancy, and depend rarely upon labour, but may cause labour and produce secondary excretory puerperal fever. He gives an analysis of the blood drawn from a patient while suffering from puerperal albuminuric eclampsia, made by Dr. Bernays. The blood contained urea and uric acid. He regards albuminuria as being evidence of the kidneys being overpowered by the double strain of having to serve as emunctories for two organisms, and thinks it probable that sometimes albuminuria and uræmia are of sudden origin, and that the convulsions follow almost immediately upon the failure of the kidneys.

Dr. Greuser relates ('Mon. f. Geb.,' 1866) a case of eclampsia followed by complete amaurosis lasting several days. The patient was a primipara aged 21. The fit broke out after labour. There was albuminuria.

Dr. Braxton Hicks contributes a memoir ('Obstet. Trans.,' viii) on eclampsia. He argues that if it were shown that, although no albumen existed in the urine before the convulsion, nor indeed any evidence whatever of ill-health up to the very moment of attack, yet that shortly after the first fit, not only albumen was to be found, but also the evidences of acute desquamative nephritis were present within twelve hours, then the author considered that we must admit either (1st) that these convulsions produced the nephritis, or (2nd) that some abnormal ingredient in the blood produced simultaneously irritation of the cerebro-spinal system and of the kidney, or (3rd) that the highly congested venous system produced by the spasm of the glottis was able to cause the nephritis. He brought forward four cases which showed the development of the acute kidney disease after the first convulsion, being about half of those where he had an opportunity of examining the state of the urine early.

IV. CHILDBED.

In a lecture ('Med. Times and Gaz.,' i, 1866) Dr. Bence Jones illustrates the production of chemical disease by previous mechanical

action. The removal of a child from the uterus, the rupture of the vessels connecting uterus and placenta; occasional rupture of uterus or perinæum, causing hæmorrhage, cut off the supply of oxygenated blood to the nerves and muscles, so that these cease to act, and death ensues. So, without severe injury or hæmorrhage, the sudden disturbance of the chemical and mechanical actions going on in the body disposes to inflammation on the excitement by cold, &c.

Contractile corpuscles of the colostrum.—In a paper read before the Vienna Academy of Sciences ('Lancet,' Sept. 8, 1866) Herr Stricker records some interesting observations upon colostrum. He states that the fresh milk which is secreted during the two or three days subsequent to parturition exhibits two varieties of phenomena in its corpuscles. The observations were conducted under the microscope. The corpuscles at first change form, and then allow fatty globules to escape; from which the author concludes that the envelope of the cells must be made of some very plastic substance, since they show no indication of rupture. Besides these bodies, others of the size of red blood-globules, and having peculiar contractile movements, have also been observed; these are perfectly transparent, and are most probably chyle- or lymph-globules. The colostrum must be kept at a temperature of 40° Centigrade in order to display these phenomena fully.

Remarks on the diet suitable after childbirth, of an historical and critical character, constitute an interesting *résumé* of this subject by Henry Lowndes ('Brit. Med. Journ.,' 1865).

Professor Dohrn has subjected to fresh experiments the determination of the *vital capacity of the lungs during and after labour* ('Monatsschr. f. Geburtsk.,' Dec. 1866). The spirometric observations of Küchenmeister, Fabius, and Wintrich, show that this capacity is not greater after labour than during pregnancy. Dohrn's experiments, on cases carefully selected to exclude sickly persons, led to the opposite conclusion. Of 100 women, there was an increase in 60 per cent. after labour, the mean increase being 338 cubic centimètres; there was no difference in 14; and a diminution in 26, the mean being 221 cubic centim. There was a difference in pluriparæ and primiparæ. In primiparæ there was an increase in 53 per cent. And the mean increase was 205 cubic centimètres; there was a diminution in 25 per cent., no change in 22 per cent. In primiparæ the capacity was greater in 64 per cent., and the mean increase was 458 cubic centimètres, and a diminution in 9 per cent. only.

Observations on the temperature in childbed. By Dr. Schröder.—Schröder has made careful examinations in the temperature of women in childbed. They extend to pathological as well as to normal conditions.

In 2 cases he thought a marked increase of temperature was due to severe after-pains. Thus, in 1 case it was to 38·5° C., in the other to 39·4° C.

More frequently the temperature rose when injuries had been sustained during labour, constituting what V. Grünewaldt called "wound-fever." In 32 cases of this kind 7 had perineal lacerations, 25 had slighter rents of the mucous membrane of the vagina. But there is a

great difference in the reaction in different individuals. The rise was seldom remarkable, only once over 40° C. It was ushered in by a slight feeling of cold.

The "milk-fever" is chiefly distinguished from the "wound-fever" by setting in later. 39.6° C. was the highest temperature observed. The pulse was seldom over 100.

Schröder then endeavours to distinguish between epidemic and non-epidemic puerperal inflammation. He takes 47 cases of fever and peritonitis in which there was circumscribed pain on pressure. These mostly fell ill with slight shivering. The temperature rose from 38.5° C. to 41.5° C. In the greater number of cases it was 40.5° C. to 41° C. The highest temperature was generally reached on the first, second, and third days.

Epidemic cases are divided, according to Virchow's scheme, into—(1) inflammatory, (2) thrombotic, (3) ichorrhæmic and septicæmic. In 4 cases of the first kind the highest temperature was 41.5° C., with a pulse of 144 and 38 respirations in the minute. In 3 cases of general diffuse peritonitis a remarkable sinking of temperature towards the fatal termination was observed.

In 2 cases of the third kind, in which puerperal sores—a characteristic indication of epidemicity—existed, the temperature was 40.9° C.; pulse 120; respiration 22.

The observations of morbid conditions are defective ('*Monatsschr. f. Geburtsk.*,' Feb. 1866).

The temperature during puerperal processes is investigated by Lehmann ('*Nederl. Tijdschr. v. Geneesk.*,' 1865). He has made many observations on healthy and sick childbed women, but has not found the results so useful in diagnosis as have other observers. He placed the thermometer in the vagina. The temperature here was generally 2° C. higher than in the axilla. The temperature of pregnant women averaged 37.4° C., whilst in healthy women it is 37° C. In chronic diseases of the genitals it was 37° — 37.6° C. During labour in healthy women the temperature often rises remarkably, *i.e.* to 40° C., but falls immediately afterwards; it remains, however, always higher during childbed than in pregnancy. It was found in the fourth week to be still 37.4° C. In the interval there are many fluctuations. Immediately after labour it is 37.6° — 8° C.; on the second and third days it attains its greatest height, 39 — 41° C., and then sinks. Pluriparæ are colder than primiparæ. The temperature is higher in the evening than in the morning. Childbed women react easily under any disturbing cause, as diet, emotions, chills, checked milk-secretion, and thus the physiological condition passes quickly into the pathological. Milk-fever commonly raises temperature to 40° C. In puerperal fever Lehmann says the inner surface of the uterus is, as a rule, the starting-point for further pathological changes. In puerperal fever the temperature rises much higher than in other diseases; 40 — 42° C. gives an unfavorable prognosis. Generally, in puerperal fever, temperature, pulse, and respiration, stand in like proportion. There are the most marked fluctuations in the pyæmic form.

Contribution to the knowledge of the relation of temperature in

childbed. By Dr. Oscar Wolf.—Oscar Wolf has continued the observations on the temperature of the body in childbed made by Drs. Wunderlich, Winckel, v. Grünwaldt, Hecker, Gierse, v. Bärensprung, and Traube. The observations were made in Marburg and Kiel, and embrace 266 cases. They are restricted to normal childbed. He found the average of 45 observations gave $37^{\circ}39'$ C. as the temperature immediately after birth, $37^{\circ}43'$ C. as the temperature in the morning, and $37^{\circ}37'$ C. as that of the evening of the first day following labour.

With regard to the influence of milk-secretion—the so-called milk-fever—upon temperature, he found a marked difference between primiparæ and multiparæ. Examined on the third day, milk setting in, the first gave an average of $37^{\circ}9'$ C., the second $37^{\circ}37'$ C. ('Monatsschr. f. Geburtsk.,' April, 1866).

Puerperal Fever.

In an elaborate memoir ('Gaz. Méd. de Paris,' 1865), Dr. Hervieux arrives at the conclusions that infection and contagion are the efficient and propagating causes of puerperal fever, and that domiciliary lying-in ought to be practised as much as possible. He lays down strict rules for the construction and administration of lying-in hospitals.

The thesis of Dr. Simon (Paris, 1866) contains a minute analysis of the modern researches on the state of the pregnant and puerperal woman as predisposing to diseases. It then describes puerperal fever. He insists that this is a general disease, as proved by the general symptoms which are identical with those of all general diseases; the marked predominance of general over local phenomena; the special course assumed by epidemics, as in determining peritonitis, phlebitis, pleurisy; the occurrence of cases in which dissection either reveals no cause or no sufficient cause of death, although suppurative lesions are commonly found. He distinguishes local pelvic phlegmasia from the epidemic puerperal fever. The thesis contains an index of writings on the subject, which is, however, very scanty as regards other than French authors.

What is the influence of traumatism in puerperal affections? is discussed in a thesis by E. Verrier (Paris, 1866).

Dr. Barnes, in an incomplete series of lectures on puerperal fever ('Lancet,' 1865-6), illustrates the etiology and pathology. He divides the causes into—1. External, or those which, taking their rise in conditions foreign to the patient herself, have to be brought to her whilst she is in a state of susceptibility to their influence. Cases thus arising he calls *heterogenetic* puerperal fever. 2. Internal, which take their rise in conditions proper to the patient herself. These cases are *autogenetic*. He adduces statistics to show that home midwifery is infinitely more successful than hospital midwifery, and advocates the substitution of home succour for lying-in women, contending that puerperal fever is mainly a disease of hospital manufacture. He describes the constitution of the pregnant woman as disposing to puerperal fever, and then the conditions induced by labour. He contends that—(1) pregnancy induces a degraded condition of blood, throws an excessive burden upon

the excretory apparatus, impedes the freedom of the circulation, causes hypertrophy of the heart. 2. Labour adds to the condition left by pregnancy—shock, extensive local injury, an enormous waste of nerve and muscle the consequence of physical exertion, greater degeneration of blood from this conversion of nerve and muscle and also from the proceeds of the involution of the uterine tissues. 3. Hence there is a greatly exalted stress upon the excretory organs and a general deterioration of the solids and fluids, inducing feeble physiological action, and, therefore, tendency to fall into pathological action, that is, to generate puerperal fever. He then sketches various forms of auto-genetic puerperal fever, taking excretory puerperal fever, uræmic excretory puerperal fever, cholæmic excretory puerperal fever, traumatic or inflammatory puerperal fever, thrombotic puerperal fever. He then examines the means by which puerperal fever is propagated, as the contagion of scarlatina, typhoid, the cadaveric poison, and the influence of inoculation or other mode of transmitting the puerperal poison. The principal sources may be grouped as follows:—1. An animal poison generated from crowding lying-in women together. 2. Bad sanitary conditions, as miasm of sewage, the air of an over-crowded dwelling, damp and cold, the use of impure water, unwholesome food, malaria from the surgical wards of an hospital. 3. Exposure, mediate or immediate, to any contagious disease, as typhoid, typhus, scarlatina, small-pox, erysipelas. 4. Direct inoculation of cadaveric matter (Sennelweis) or of other animal poison, by means of poisons coming into contact with the lying-in woman.

Dr. Mair gives ('Aerztl. Intell. Blatt Baierns,' 1865) an illustration of the contagiousness of puerperal fever. A nurse attached to a patient affected carried the disease, by means of the putrid lochial discharge, to six recent puerperæ, who all died.

On the causes of epidemic puerperal fever in maternities ('Aerztl. Intell. Blatt Baierns,' 1865).—Dr. Kaufmann contends for a miasm which does not, under all conditions, but only under certain predisposing ones, cause puerperal fever. He denies septic infection. The only remedy is appropriate ventilation and cleanliness. In debate upon this, Veit, of Bonn, Winkel, of Rostock, Pernice, of Greifswald, Martin, of Berlin, maintained the doctrine of infection; Maubiewitz, of Mülhausen, insisted upon lesions of the genitals following operations.

Dr. Snow Beck, in a paper on the causes of puerperal fever ('Obstet. Trans.,' vii), sums up in the following conclusions:—1. The phenomena of puerperal fever may be produced by the introduction of poisonous fluid into the general system. 2. The uterine sinuses, remaining pervious to the flow of fluids, would afford a means by which the poisonous fluid would enter the system. 3. The pervious condition of the sinuses remained in consequence of the absence of that firm and persistent contraction of the uterus after childbirth which appears necessary to effectually close these canals, and prevent all circulation of fluid in them. 4. The secretion from the interior of the uterus was probably sufficient, when mixed with the blood, to induce the effects observed. And it would further follow that, 5, the various phenomena observed in puerperal fever may arise from this cause, modified by many incidental

states; and the various inflammatory actions and products observed in the course of the disease would not be the essential parts of the disease, but the morbid phenomena which occurred during the course of it. 6. The primary, though not the only, object in the prevention of these attacks of puerperal fever will, then, be to procure a firm, complete, and persistent contraction of the uterus after the birth of the child, and thus effectually to cut off circulation within the vessels of the organ.

In a memoir ('Mon. f. Geb.,' 1865) on the etiology of puerperal fever, Dr. Carl Mayrhofer, assistant in Prof. Braun's clinique at Vienna, brings forward arguments to show that the primary cause is the introduction of vibriones into the vagina. He first adduces the experiments of Bassi upon the muscardini in silkworms, which prove that the fungus called *Botrytis Bassiana* can actually cause the death of the silkworm by being transplanted to healthy worms. Mayrhofer collected from the uteri of women dead of puerperal fever secretions by means of a glass pump, and always found vibriones. That there is a real process of decomposition in the fluid contents of the genital canal in these cases of puerperal fever is admitted in the expressions "septic enmetritis," "putrid lochia," "putrescence of the uterus." He believes that the presence of oxygen is of little moment in producing this. Vibriones are very seldom found in the lochia. The reason is that vibriones perish in fluids having acid reaction, and so long as the vaginal mucus retains its acid property vibriones will not live or multiply. The acid reaction commonly lasts during labour until the rupture of the membranes, when the liquor amnii bathes the vagina with alkaline fluid. It is commonly by means of the examining finger that vibriones are carried to the upper part of the vagina. In connection with this it is remarked that women delivered out of hospital or in the street, although immediately afterwards admitted into hospital, usually escape puerperal fever, obviously because they escape examination. Again, protracted labour favours the injurious process in this way:—After rupture of membranes the head may be for a day or more upon the brim; the liquor amnii retained at this part becomes foul, fever sets in, and the uterus seems exhausted. Under these circumstances enmetritis may arise, even during labour. Mayrhofer says here the liquor amnii is turned to putrid fermentation by vibriones, which are actually formed in such liquor amnii. He concludes generally that enmetritis arises from putrid fermentation of the fluids in the genital canal, and that if this be true, then, to maintain an acid condition of these fluids is to preserve the patient. He therefore uses hydrochloric acid to maintain this condition. He combats the theory that puerperal fever depends primarily upon blood infection.

Dr. Hervieux ('Gaz. Méd. de Paris,' 1865) states the following conclusions from his researches on *puerperal erysipelas*. Like common erysipelas, it may be phlyctenoid, phlegmonous, or gangrenous. It may affect every part of the body, especially the face, nates, and extremities. It may be sporadic or epidemic. There are two kinds of causes—local and general. The local are superficial tumours, lesions, and lacerations. Erysipelas of the nates may be caused by the lochial

discharges. The general causes are the accumulation of lying-in women in hospitals, whence transmission by infection or contagion. He has observed two cases of erysipelas in pregnant women, both ending in recovery.

Of 563 puerperal women under treatment in the Milan Hospital (see Casati's report), 358 left well, 159 passed into the Foundling as nurses, 27 died, and 19 remained. The mortality was 4·7 per cent.; 192, or more than one third of the whole, suffered from some form of illness. There were 22 cases of metritis with miliaria, 20 of simple metritis, 10 of metro-peritonitis, 8 of metro-peritonitis with miliaria, 30 of miliary fever, 10 of puerperal fever, and 17 of metrorrhagia.

Amongst the facts specially deserving notice is the use of *sulphite* of magnesia in puerperal affections. This medicine was given in 22 cases, in doses of 20 grammes divided in two powders, taken within 24 hours as a drink, excluding all acid substances. Some women, after taking one or two doses, refused to take more, complaining of the nauseous taste. Commonly frequent stools, and even diarrhœa, ensued; the stools had a fetid odour, like that of rotten eggs; and although the wards were airy, and by no means crowded, the bad odour produced was so great as to become noxious to the nurses. This odour seemed even to contaminate the linen, and to adhere to it after washing. Upon the whole, Casati is unable to affirm that the medicine has any power of destroying or of modifying the miasmatic element or ferment. See remarks on *abdominal typhus* in childbed, by C. Hecker ('Mon. f. Geb.,' 1866).

Dr. Hildebrandt narrates (*ibid.*, 1865) the puerperal events in the Lying-in Hospital of Königsberg during the last 7 years. Dr. Otto Wermüller (l. c.) describes the epidemic which prevailed in the district of Maur, Zurich, 1863-4.

Dr. Veit describes (*ibid.*) the puerperal diseases that occurred in the Bonn Lying-in Clinique, 1864, 1865. In 35 cases it was commonly observed that with the onset of fever there was diminution of the lochia, then this discharge emitted a pungent empyreumatic odour, then purulent matter and small thrombi were mixed with it. In half the cases a diphtheritic layer covered any wounds or excoriations that were made during labour on the labia or perinæum, vagina, or os uteri. In 13 of these cases there was swelling of the cellular tissue adjoining the uterus. These arose externally to the peritoneum, and almost always came on during the first week. Veit enters minutely on the question of etiology of puerperal fever, and contends strongly that the cause is direct infection of septic matter conveyed by the examining finger. He gives the following history:—On the 7th Feb., at 9 p.m., a woman died of septicæmia. In the following night the assistant delivered a woman in town. This woman died on the 12th with diphtheritis uteri and purulent peritonitis, and became the source of infection to another patient in hospital, who sickened immediately after her delivery on the 13th. Veit determined that the interval between the first symptoms and the first examinations were, in one case 27 hours, in three from 30 to 32 hours, in four from 36 to 40 hours, in twelve from 40 to 48 hours. The period of incubation is, therefore, rarely more than two days.

Dr. Spiegelberg relates ('Mon. f. Geburtsk.,' Dec. 1866) a case of puerperal peritonitis following perforation of a suppurated lymph-cavern of the fundus uteri, ending in death. The woman was delivered, after an ordinary labour, of a child that died two days afterwards. On the eighth day vomiting and pain set in, fever and peritonitis; death on the twelfth day. Effusion in the peritoneal cavity, also in the pleuræ. Directly near the origin of the right tube, on the posterior surface of the uterus, was a raised discoloured spot, having a small opening leading into two cavities. These communicated with the cavity of the tube, which contained an abscess.

Report on the post-mortem examinations made in the Lying-in Institution of the Grand Duchess Helena Paulowna (St. Petersburg), 1862-3. By Dr. Erichsen.—The pathological conditions found in the dissections carried out during two years in the St. Petersburg Lying-in Hospital are classed under three following heads:—1st. Puerperal inflammation. 2. Puerperal thrombosis. 3. Puerperal ichorrhæmia. Of puerperal inflammation three kinds are distinguished—peritonitis, phlegmon, and metritis. Dr. Erichsen describes a group of nineteen cases of universal peritonitis. He rejects the view of Martin, Buhl, and others, that endometritis and salpingitis is the starting-point of all puerperal affections, and that in every case these inflammations precede and cause the peritonitis. He found only eleven cases in which peritonitis was complicated with endometritis, and in eight cases of peritonitis there was no trace of endometritis. He found only nine cases of purulent salpingitis, whilst in ten cases the total mucous membrane was either normal or simply affected with catarrhal swelling. Of the nine cases of purulent salpingitis six were double, in three the right tube only was involved. He thinks it a question whether the salpingitis may not frequently be the consequence of the peritonitis.

To the foregoing cases the author adds eight cases of secondary peritonitis following upon other childbed affections. In these he sees evidence of a contagious character; that is, a tendency to rapid, continuous extension, and a disposition to involve other systems in the morbid circle—this is *puerperal phlegmon*. The feature of this is inflammation of the subserous cellular tissue of the uterus and appendages (Virchow's parametritis), then inflammation of the pelvic cellular tissue, and lastly of the subcutaneous tissue of the thigh and abdominal wall. The source of these diseases is mostly a diphtheritic process of the inner surface of the uterus, but the author saw genuine pelvic phlegmon and parametritis arise. Again, vein thrombosis of the pelvis and of the crural veins is frequently the cause of phlegmon. Generally the first form of disease spreads over the whole subserous tissue of the uterus and broad ligaments, which then seem to be pulpy, as if swollen from œdematous infiltration; at a later period there is formed in the same place a continuous layer of pus, whereupon a regressive metamorphosis, fatty degeneration, ensues. Not seldom he found small abscess-like formations, like strings of pearls, which proved to be lymphatic vessels filled with thrombi, and leading to inflamed swollen lymphatic glands.

Puerperal metritis.—Of this condition he found only a few cases in

which the whole organ was affected; but forms of partial metritis were very common. The seat of insertion of the placenta, and next the vaginal portion, were mostly much infiltrated. Diffuse metritis especially affected the interstitial tissue. He never saw interparietal abscesses.

2. *Puerperal thrombosis*.—After Virchow, he divides this into three kinds—the placental, the dilatation, and the compression thrombosis. The formation of rapidly extending placental thrombosis into the abnormally widened vessels is apt to pass into the dilatation thrombi which form in the pampiniform and uterine plexuses, the deeper pelvic veins and internal spermatic. The cause of the clotting is here the retardation of the blood-stream, caused by the abnormal dimensions of the vessels. The compression thrombi are found in the veins of the thighs, and are caused mostly, but not always, by the pressure of the gravid uterus. The most frequent issue of thrombosis is ichorrhæmia, sometimes proceeding from the softening of the thrombi, and thus causing self-infection.

3. *Puerperal ichorrhæmia*.—This is characterised by parenchymatous inflammations in the spleen, liver, and kidneys. The process is shown in its most intense form in those cases where the appearances amount to acute atrophy of the liver, which, he says, is caused by infection ('Mon. f. Geb.,' January, 1866).

Cases of phlegmonous dissecting perivaginitis. By Dr. Marconnet, of Moscow ('Virchow's Archiv,' 1865).

Case of tuberos decidual endometritis. By Dr. Gusserow ('Mon. f. Geburtsk.,' May, 1866).

Dr. Duncan describes ('Edin. Med. Journ.,' April, 1866) two very interesting cases of serous collections in the pelvis following labour. The symptoms, general and physical, at first resembled those of ordinary pelvic cellulitis. In one case a tumour formed in the right hypogastric region, extending midway to the umbilicus. The tumour was punctured by vagina, and about nine ounces of fluid, scarcely turbid, and of a light green colour, were drawn off. The tumour then disappeared.

A case of puerperal fetid pulmonary abscess is reported by Dr. J. A. Byrne ('Med. Press,' 1866). This case was that of a primipara who had been ten hours in labour, there having been no complication beyond a little post-partum hæmorrhage. On the third day there was rigor, pain in the pubic and iliac regions. On the sixth day stitch in the right side, but no cough. On the seventh day violent mania broke out, and lasted several days. When this declined cough appeared, and a peculiar fœtor was perceived in the mouth. On the twenty-sixth day she expectorated a large bowlful of a greenish purulent fluid, possessing the most intolerable gangrenous fœtor. Similar symptoms returned from time to time, and the case ended fatally by hectic three months after delivery.

Retroversion of the uterus during the first days after labour is described by Cohnstein ('Berl. Klin. Wchnschr.,' 1865).

Dr. Poppel contributes ('Mon. f. Geb.,' 1865) an essay on *coprostasis* in childbed. He considers constipation to be an idiopathic condition in childbed, resembling the paralysis of the bladder.

Professor Martin relates 2 cases of *constriction of the intestine* by exudation-bands occurring from peritonitis in childbed. Both ended fatally. Constipation and vomiting, then fecal vomiting. In one case a bilocular uterus was found ('Mon. f. Geb.,' 1865).

Dr. Fussell relates ('St. George's Hospital Reports,' 1866) 3 cases illustrating the association of *paralysis* with childbirth.

Case 1.—An example of paralysis from a direct mechanical cause. A lady had, as the head was entering the pelvis, the most violent cramps, followed by complete loss of sensation and motion in the legs, lasting for 3 or 4 months. Presentation natural; no albumen in the urine; no cerebral disturbance.

Case 2.—A lady gave birth to twins at the full time, stillborn. Slight loss of power in the hands followed; gradually all power of movement in both upper and lower extremities was lost. No loss of sensation; no albumen in the urine; no cerebral disturbance. In about three months she perfectly recovered.

Case 3.—A girl, æt. 15, had been in labour about 4 hours. Hæmorrhage followed the placenta. In ten days phlegmasia dolens seized the right leg, and then, in some days, suddenly hemiplegia of the right side appeared. This only disappeared after 14 months.

Dr. Putégnat communicates ('Journ. de Méd., &c., Bruxelles,' 1865) an essay on puerperal *iliac abscess*. He divides the cases into those which terminate by resolution and those which find an external issue of the suppuration. He relates four cases of his own.

On purulent *effusions into the joints*, &c., in puerperal women. Dr. Beatty (Dublin, 1866).

Dr. Snow Beck read a paper ('Obstet. Trans.,' viii) on *enlargements of the uterus* which follow abortions, premature or natural confinements; with cases. The author remarked that these enlargements had been long recognised by pathological anatomists, and quoted some microscopical observations by himself, and communicated to the Medical Society of London in 1851, which showed that the pathological condition essentially consisted in an enlargement of the muscular tissue of the uterus, without the presence of any inflammatory or heterologous deposits. The causes were considered to depend chiefly upon—(1) a want of complete and persistent contraction of the uterus, which permitted an increased circulation of blood in the gravid organ, and interfered with the changes which took place after parturition; and (2) on the partially developed state of the uterine tissue in abortion, which appeared to be unfavorable to the development of those changes necessary to its complete reduction in size. The enlargement of itself gave rise to few and comparatively slight symptoms, unless it existed to such an extent as to be felt as a tumour in the hypogastrium; but it rendered the patient liable to profuse hæmorrhages, coming on suddenly and without appreciable cause. These enlargements might exist for many months, or even for some years, without any symptoms of importance; but from the recurrence of the catamenia, or other causes, congestion of the enlarged organ was gradually induced; or congestive inflammation, which may be either of the whole or of any portion of the uterus, might take place, the usual symptoms of uterine affection being then present. Amongst

the subsequent changes which took place were anteversion and retroversion, with more or less bending of the organ, which lesions interfered with subsequent impregnation. But a more important change was a gradual hardening of the organ, which reduced it to an indolent state, and rendered it very rebellious to treatment. The modification of the symptoms thus produced was shown by the cases recorded, and the physical examination of the organ detailed. The author found that in these cases the uterus was equally enlarged, smooth, pyriform, the cavity enlarged, and the orifice open. The sound readily passed to an extent varying from 3 to 5 or 6 inches. When inflammation was added the organ became tender, the arteries were felt to beat with more or less force, and the interior became very sensitive. Subsequent and various alterations were made; the lips became enlarged, often lobulated, projecting into the vagina, red and raw in appearance, and bounded by a distinct line, which marked the division between the mucous membrane of the vagina and that of the uterus. It was this condition of the organ which had been so frequently described as ulceration, although no such morbid change actually existed. With respect to the treatment, various cases were recorded showing the importance of injecting the cavity of the uterus with astringent lotions, and the safety with which it could be done, provided the actions of the uterus were perfectly quiescent. The cavity of the uterus being enlarged, and the orifice open, impregnation readily took place, and the physiological changes which followed were decidedly the best means of restoring the organ to the healthy state.

On the therapeutics of puerperal inflammations of the sexual organs. Dr. Martin ('Mon. f. Geburtsk.,' 1865).

Professor Dohrn examines the value ('Mon. f. Geb.,' 1865) of collodium in puerperal fever. Latour advocates (1859) the practice of painting over the abdomen with collodium, so as to form an impermeable coating, as a powerful remedy in this disease. Tarnoffsky, of St. Petersburg, tried it in 99 cases, and reported favorably. Dohrn tried it in 31 cases, and says it did good in 28. He thinks it acts by causing contraction of the abdomen.

M. Bataill  ('Acad. de M d.,' 1865), believing that puerperal fever starts from non-contraction of the uterus, proposes to treat the uterus like a wound, and to guard against infection by alcoholic injections.

Dr. Spiegelberg relates ('Mon. f. Geb.,' Dec. 1866) a case of *sudden death* on the third day of childbed, from rupture of the left ventricle in consequence of acute myocarditis.

Dr. Barnes related ('Obstet. Trans.,' viii) 2 cases of sudden death during labour. In 1 case, that of a primipara, maniacal excitement came on during the dilatation of the cervix. Chloroform was given to induce moderate an sthesia, so as to facilitate the introduction of the forceps. Gentle traction, aided by uterine action, effected delivery in half an hour. The placenta was cast. A good pulse was maintained. The patient spoke deliriously at times, but also rationally afterwards. Death occurred almost suddenly ten hours after delivery. No post-mortem examination. Dr. Barnes did not think death was owing to the

chloroform, but was disposed to attribute it to the nervous shock which was manifested before the chloroform was given. The second case was more clear. The woman was in her seventh labour. The child was expelled alive. The mother died in 20 minutes afterwards, a slight convulsion having shortly preceded. A small clot, quite recent, was found in the left thalamus opticus, and another, larger and of a dissecting character, in the left crus cerebri. The abdominal and pectoral organs were quite healthy.

Dr. Hervieux ('Gaz. d. Hôp.,' 1865) relates 2 cases of sudden death in puerperæ. One was due to heart disease, the other to miningeal apoplexy.

A case of *embolia* of the pulmonary artery in a puerperal woman. By Dr. F. Ritter.—In this case the patient was pluriparous, æt. 26. The first day of childbed went off quite regularly; then the lochia became offensive, and slight pain was felt on pressure. Temperature 38°C . These symptoms disappeared. Eight days afterwards she suddenly fell back in deep syncope; consciousness did not altogether leave her. When seen the face was pale; she seemed dying; respiration not much accelerated; pulse very small and frequent; she complained of oppression in the chest. Next day these symptoms persisted; the temperature was 36°C .; respirations were catching in character, 36; cyanotic lips and tongue; subsequently pulse and respirations increased in frequency; temperature fell. She died on the third day. *Autopsy*.—In the right horn of the uterus was an abscess; inside uterus no disease. In ovarian veins small yellow fibrin-clots, apparently formed before death. In the right chief branch of the pulmonary artery was a pale red, delicate thrombus, plugging the vessel ('Mon. f. Geb.,' Feb., 1866).

Thrombosis.

Dr. Casati relates a case of thrombosis occurring in a pregnant woman in the Milan hospital. She was anasarcaous and had albuminuria; she was bled. A live child was born prematurely. The abdomen became painful with meteorism. She was again bled. On the fifth day she became agitated, the lips and hands cold and blue, a sense of suffocation, sub-delirium, loss of speech, orthopnoea, and rapidly death. In the pulmonary vessels, as far as the branches of the third and fourth degree, were fibrinous coagula. In the abdominal cavity were six quarts of puriform serum. Fibrinous clots were found also in the vessels of the neck, in the upper part of the aorta, and in the bronchial arteries and veins, but none in the vessels below the heart. The papillæ of the optic nerve and a portion of the surrounding retina were spotted with white granules of inflammatory matter; the retina was turbid and thickened. In one eye there were hæmorrhagic spots in addition.

Mr. E. H. Roe relates ('Lancet,' i, 1865) a case of embolism. A single woman, æt. 40, had a tedious labour terminated by forceps; perinæum slightly torn; slight abdominal pain next day, and she did not rally. On the twenty-eighth day, after seeming better, after getting up to the night-chair, she became suddenly agitated, throwing her arms

violently about, and exclaiming that she was dying; breathing deep, irregular, gasping; fæces and urine passed under her. In half an hour she was dead. The heart was found pale, flabby; both sides almost empty; valves healthy; lungs crepitate; both branches of the pulmonary artery contained light-coloured, fibrinous clots, which pulled in branches. Involution of uterus perfect.

Mr. Charles Sumner relates a case ('Brit. Med. Journ.,' 1866):—A woman had profuse hæmorrhage, in her seventh month, from placenta prævia, for which she was delivered. On the fourth day she had a severe shudder and headache. This was repeated next day and the two following days, and she got better, but the pulse remained quick and feeble. She died, after syncope, almost suddenly. A clot was found in the right side of the heart and pulmonary artery. The uterus was well contracted. There was extravasation of dull crassamentum in a cavity at the back of the pelvis outside the peritoneum.

Case of embolism of the pulmonary artery after ovariectomy By Dr. E. Parsons ('Obstet. Trans.,' vii).

On Puerperal Tetanus.

A case of tetanus after labour is recorded by Mr. H. Viant ('Med. Times and Gaz.,' 1866). A woman had been delivered by a midwife of a healthy child, without hæmorrhage. On the fourth day she got up and went down stairs. Next day, whilst out of bed, suddenly she had trismus. It was supposed she had taken cold, and had a stiff neck. On the sixth day the symptoms were aggravated. Convulsions every two or three minutes, with complete opisthotonos; no pain in abdomen; lochia persistent. Next day she died. Chloroform gave only temporary relief.

Dr. Denham relates ('Dub. Quart. Journ. of Med. Sc.,' 1865) four cases of tetanus in labour.

Dr. Philipson relates ('Brit. Med. Journ.,' June, 1865) a case in which tetanus occurred, after the third labour, in a woman æt. 39. The placenta was adherent; it had to be detached; rather free flooding attended. Two days after delivery some difficulty was experienced in opening the mouth and in turning the head from side to side. She had been sitting near a window. The rigidity increased, and on the fourth day the mouth was closed. When undisturbed she was free from pain. Pulse 100; opisthotonos on moving her. No uterine tenderness. Deglutition became difficult. She had enemata of turpentine and castor-oil. She died the same night. Autopsy not permitted.

Case of puerperal tetanus following abortion and plugging of the vagina. By Jos. Blackshaw (ibid., Sept., 1865).—The patient was 48 years of age. The vagina was plugged on account of profuse hæmorrhage from threatened abortion. Ten days afterwards she complained of great stiffness of the deep-seated muscles of the neck and throat, attributed to taking cold. Trismus was manifest. This increased in severity; tetanic convulsions set in; opisthotonos; death from exhaustion five days from the beginning of the attack. She had a turpentine enema.

Rupture of a varix in the vagina. By Dr. Halfer ('Schmidt's Jahrb.,' 1866).—Halfer's case was that of a multipara, who, during her preceding pregnancy, suffered from a large varix of the left leg. She was delivered naturally. Twenty-one days afterwards a gush of blood took place from the vagina. This recurred repeatedly, and caused death in five days. At the autopsy two rents were found on the posterior wall of the vagina leading to a burst varix; one extended under the pelvic fascia into a cavity filled with extravasated blood.

Puerperal Insanity.

On the statistics of puerperal insanity, as observed in the Royal Edinburgh Asylum. By Dr. J. B. Tuke ('Edin. Med. Journ.,' 1865).

V. THE FŒTUS AND NEW-BORN INFANT.

The following cases of *monstrosity*, or *congenital disease*, are recorded.

Double monstrosity, with account of the delivery. W. Wills ('Obs. Trans.,' vii). Case of recovery of a stillborn child; unusual marking of the skin, simulating the effects of injury. John Rouse (ibid.). Case of imperforate bowel; operation; death. Dr. Meadows (ibid.). Case of monstrosity. W. Gayton (ibid.). Case of laceration of the integument during delivery. R. K. Pierce (ibid.). Anencephalic fœtus. H. Harley (ibid.). Monstrosity, with remarks on the influence of maternal impressions on the fœtus in utero. Dr. Meadows (ibid.). Hernia cerebri and hernia umbilicalis, with attachment of the fœtal membranes to the scalp. Dr. T. H. James (ibid.). A rare form of twin-monstrosity. Rich. Ellis (ibid.). Case of vascular erectile tumour in the sheath of the umbilical cord. F. Lawton (ibid.). Monster fœtus. Mr. Thane (ibid.). There is a memoir on monsters, containing a particular description of the Portuguese seen in London two or three years ago, with a double penis and a third leg pendent between the thighs, by Teixeira Marques (in the 'Revista Medica Portuguesa,' and translated in the 'Journ. de Méd., &c., de Brux.,' 1865). Case of double monstrosity. Dr. Swayne ('Obs. Trans.,' viii). Child born with amputated upper and lower extremities. Baker Brown, jun. (ibid.). Rare form of monstrosity. Dr. Gervis (ibid.). Singular malformation. Dr. Neale (ibid.). Acephalous monstrosity; absence of abdominal covering. Dr. G. Hewitt (ibid.). A case of twin-pregnancy occurring two years after ovariectomy, in which one of the children was born with a spina bifida and defect of the umbilical walls, is recorded. Dr. Parson ('Lancet,' 1866). Drs. Breslau and Rindfleisch ('Virchow's Archiv,' 1684) describe a case of fœtus in fœtû. The fœtus was female. The elements of the included fœtus were contained in a cranial tumour. Dr. Rose describes with great minuteness ('Mon. f. Geb.,' 1866) a case of monstrosity in which the external eyes were defective, and cites many recorded cases of congenital anomalies of the eye. On congenital defects found in the eyes of some children. By Dr. Mattioli ('Gazz. Med. Italiana'). Dr. Mattioli refers to congenital total opacity of the cornea, of which he gives an example. Mechanical obstruction in the growth of a fœtus. W. B. Owen ('Obs. Trans.,' viii). Mum-

mified foetus expelled after the birth of a full-term child. Dr. Barnes (*ibid.*). *Atelectasis of the lungs* is discussed in 'Klinische Beiträge z. Gynakol.,' 1865, by Betschler. Congenital hypertrophy and prolapsus of the tongue. Dr. Lgouest ('Journ. f. Kinderk.,' xliv, 1865). Inversion of the urinary bladder through the urethra, with large prolapsus of the rectum in a female child. Dr. Beatty. A case of dilated kidneys in a child; congenital hydronephrosis. Dr. Broadbent ('Pathol. Trans.,' xvi, 1865). The subject of congenital goitre is treated of by Alex. R. Simpson ('Glasgow Med. Journ.,' 1866). Prof. Raff-Mattei ('Journ. de Brux.,' 1865) calls attention to *the frequency and causes of simple congestion and hæmorrhage of the supra-renal bodies of the foetus*. He examined the bodies of ninety children—some foetuses, some newborn, some under a month old. Of these, seventy-five exhibited either congestion or apoplexies in the supra-renal capsules. The frequency of this condition is explained by the pressure exerted upon the child during birth, after the escape of the liquor amnii.

The deviations of the base of the skull in *chronic hydrocephalus* are described by Prescott Hewitt ('St. George's Hospital Reports,' 1866). His researches have an important bearing upon diagnosis, and possibly upon obstetric practice. The deviations of the vault of the skull are obvious enough; those of the base less so. The most interesting of the latter is that of the orbital plates, which are either driven downwards, presenting a plane surface oblique from before backwards, or they may be perpendicular, or even convex, bulging into the orbit, so as to reduce it to a mere chink. This deviation is associated with dropsy of the ventricles. On the other hand, in arachnoideous dropsy the fluid is limited to the upper and lateral parts of the surface of the brain, and therefore cannot press upon the bones at the base. The orbital deviation may be recognised during life; the eyes, more or less driven out of their sockets, have a marked downward direction; a great part of the pupil is hidden beneath the lower lid, and the white of the eye is much more uncovered than usual. This is the mark of ventricular dropsy. The next important deviations are those of the middle fossæ. These are most marked in the lateral regions, where, by the bulging out of the bones, the base in some cases undergoes extension and strange alterations. Sometimes a large pouch bulges outwards, and, projecting outwards into the region of the cheek, gives the appearance of the child's cheek being blown out.

Attention is directed to an essay on *osteogenesis imperfecta*, by Dr. Bidder ('Mon. f. Geb.,' 1866), as illustrating the subject of diseases of the bones in the foetus.

Dr. Wilson relates the following case ('Glasgow Med. Journ.,' 1866). In a child aged nine months the head measured twenty-three inches in circumference, gradually enlarged from chronic hydrocephalus. At three different times thirteen ounces of clear serum were drawn off, by tapping, from the anterior fontanelle. Firm pressure was kept up during and after the escape by an elastic bandage. Result not stated.

On the diagnosis, prognosis, and treatment of hydrocephalus. Dr. Henry Kennedy ('Dublin Obstet. Soc.,' 1865).—He calls attention to the similitude of the symptoms with those of typhus. In treatment he insists upon early application of leeches to the neck; the use of calomel

and jalap; blisters. The calomel is given only as a purgative; as an alternative, iodide of potassium is better, to which the addition of a few drops of tincture of digitalis, to promote diuresis, is useful.

On the treatment of spina bifida, by Dr. Giralaldès.—Iodine injections were used ('Journ. f. Kinderkr.,' xlv, 1866).

On the differential diagnosis of chronic hydrocephalus and of rickets by means of the ophthalmoscope. By Dr. Bouchut ('Union Médicale,' 1865).—In chronic hydrocephalus, he says, the blood-circulation and nutrition of the fundus of the eye suffer alteration, which are easily explained by compression of the brain through the accumulation of fluid in the skull. These changes can be easily seen by the ophthalmoscope. In proportion as the fluid collects and the pressure increases we see—1, greater vascularity of the pupil and choroid, with dilatation of the veins, which preserve their normal colour; 2, an increase in the number of the vessels of the choroid; 3, a partial or complete serous infiltration of the pupils; 4, atrophy of the choroid and its vessels; and 5, a more or less marked, at times complete, atrophy of the optic nerve. In rickets of the skull none of these appearances are seen.

Dr. L. Joseph and Dr. M. B. Freund give ('Klinische Beiträge z. Kynakologie,' Breslau, 1865) very careful anatomical descriptions of the skulls of three cases of *hydrocephalus internus congenitus*. The authors conclude that the exudation in the cavities of the brain is the primary process, which, taking place, causes resorption of bone by the unusual pressure exerted.

See a case of meningocoele in the occipital region, which was injected with iodine without ill-consequences. T. Holmes ('St. George's Hosp. Rep.,' 1866).

Mr. Thomas Smith ('Bartholomew's Report,' i) describes minutely *congenital cystic tumours*. He says they may be distinguished from spina bifida when occurring in the course of the spinal column by—1, the healthy condition of the skin over the cystic tumours, as distinguished from the discoloured and often attenuated integuments over the sac of a spina bifida; 2, by the absence of any signs of deficient innervation in the trunk and lower extremities. It is probable, he says, that this disease is more frequent in the female sex, and more than probable that first-born children are exceptionally liable to it.

Mr. Turner (ibid.) describes a cutaneous proliferous cyst containing hair found within the cranium of a young child.

Reference is made to a memoir on epignathus by C. Hecker ('Mon. f. Geb.,' 1865).

On the influence of labour on the fœtus, especially in relation to the origin of *asphyxia and apnoea* in new-born children. By B. S. Schultze ('Virchow's Archiv,' 1866).—Dr. Schultze, whose previous researches on the asphyxia of new-born children are favorably known, contributes a memoir in which he endeavours to prove—1st, that interruption of the placental interchange of gas may produce deep asphyxia, and even asphyctic death, without inducing respiratory movements; and 2ndly, that under certain, perhaps frequent conditions, even after the symptoms of asphyxia from impeded placental gas-exchange have set in, and directly through the consequences of the intra-uterine asphyxia

before the completion of labour, the dangers of this condition will be again removed.

The opinions of Hecker and others, now generally accepted, are thus expressed by Schwartz:—When the gas-exchange is disturbed by the expulsive pains, which impede the placental circulation, the inspiratory muscles of the foetus are incited to premature action. In ordinary head-labour the respiratory openings of the foetus are directed upwards within the vagina until the occiput turns under the pubic arch, and are immersed in the fluids of the amnion and genital passages, so that if attempt at respiration be made an aspiration of liquor amnii or mucus takes place. This will be made manifest after birth by the rattling and frothing during breathing. But this symptom is absent in fully live-born children. On the other hand, there is always seen in children dying during labour, or in those born dying, apparently dead, and capable of resuscitation, or in those born with slender loss of vital energy, a filling of the air-passages with prematurely sucked-in fluids. In completely normal birth the respiratory openings and air-passages are found free from foreign contents, for whilst the child is driven from the vagina the action of the facial respiratory muscles begins; the contraction of the diaphragm of the neck and chest-muscles follows immediately upon the elevation of the nostrils and the gaping of the mouth; the inspired air enters suddenly in such quantity into the lungs as to render possible a loud cry; the voice- and breath-sound are quite clear, and unattended by rattling. The above is generally admitted by Schultze; but he demurs to the proposition that every labour-pain which impedes the gas-exchange also acts as an excitor of respiration. He says in the event of mechanical obstruction to the placental circulation, the more suddenly the diminution of oxygen takes place in the foetal blood, by so much the stronger is the stimulus to respiration; the stronger and the more frequent the respiration, by so much the more extensive is the lessening of the placental circulation and the impoverishment of the blood in oxygen. This is the circle which, once begun, is so commonly fatal. But with the loss of oxygen there is diminution of the excitability under the influence of which the inspirations cease. The vagus nerve, exhausted by the continuance of the excitation, ceases to be susceptible to the stimulus of deficient oxygen, and the heart's action regains strength and frequency. Now if the gas-exchange be quite cut off or much reduced by death or loss of blood of the mother, by continuous pressure on the cord, or by other causes, the excitability of the foetal nervous system naturally sinks more and more; with the cessation of the excitability of the vagus the heart will beat quicker; but if the sympathetic is also paralysed, the heart will cease altogether. If, on the other hand, the conditions for the resumption of gas-exchange remain, there exists in the narcosis induced by the venosity of the blood exactly the cause for this resumption. Since the inspirations are no longer present, the lung-circulation becomes again smaller, the placental circulation regains strength the more that with the fall of the excitability of the vagus, so when the stimulus outlasts the time of excitability, with the advancing exhaustion of the vagus, there is a rise in the frequency and energy of the heart-contraction, by the aid of which the transmission of oxygen to the child's brain becomes again so copious that the narcosis either

vanishes, or is reduced to that degree that the complete shutting off of the channel by which the access of oxygen took place hitherto, which happens on the completion of labour, creates a powerful stimulus to set up normal inspiration.

The subject is also discussed by B. S. Schultze in a memoir on the best method of restoring apparently dead-born children ('Mon. f. Geb.,' 1866); in a report on living without breathing in new-born children by Devergie on a treatise by Bardinet ('Bull. de l'Acad.,' Augt., 1865); in a report by Danyau on the dead fœtus and new-born infant (ibid.).

Dr. Stempelmann, in a prize essay ('Mon. f. Geb.,' 1866) gives an historical *résumé* of the subject of resuscitation of asphyxiated new-born children, and states two cases in which the effect of sucking out the mucus from the air-passages was strikingly successful.

E. Rose gives ('Mon. f. Geb.,' 1865) an elaborate memoir, historical and critical, on retention of urine in new-born children. It embraces recorded cases of anomalies of the urinary organs.

Dr. Kirby relates ('Bayer. Aerzt. Intell. Bl.,' 1865) two cases of *vagitus uterinus*.

The subject of *intra-utrine breathing* is discussed by Dr. S. Kristeller ('Monschr. f. Geb.,' 1865).

On the estimation of the *bodily development of children*. Prof. A. Brunniche, of Copenhagen ('Journ. f. Kinderkr.,' xlvii, 1866).—Dr. Brunniche has made a series of comparative examinations as to the progressive and relative development of children at different ages. He has taken the following data in children, divided into 10 classes, according to age, from 2 to 8 years, weight, height, circumference of head, circumference of chest. These are some of his results:—The weight increases regularly with age. In boys of good development, who weigh 10371 grammes at 2 years, acquisition is 9330 grammes at 8 years; Whilst in boys of small development, beginning with 8795 grammes, the gain is only 7888 grammes at 8 years. A similar rule is observed in girls. The chest circumference seems to increase regularly from the 2nd to the 8th year. The increase of the head does not appear to proceed so remarkably during the latter half of the 6 years. The relative proportions of chest and head vary in a definite order. Under three years the circumference of the head is greater than that of the chest. It is a sign of good development if at $3\frac{1}{2}$ years the chest equals or rather exceeds that of the head. Observations were also made upon the development of scrofulous, chachitic, and tuberculous children.

On idiopathic bleedings from the *umbilicus* in new-born children. By Dr. A. Weber ('Journ. f. Kinderkr.,' vi, 1866).—Weber relates two cases. In one the bleeding broke out on the 37th day after birth; it ended fatally. It was ascertained that the blood came from the unclosed right umbilical artery. In the second case the bleeding seemed caused by continuous violent screaming. Weber refers to a memoir by Grandidier relating three cases, and to another by Dr. Hagen relating three cases.

A case of umbilical hæmorrhage was related by Mr. W. Sedgwick ('Brit. Med. Journ.,' 1866). Hæmorrhage occurred on the 9th day after birth.

Dr. G. de G. Griffith relates (ibid.) a case in which the root of the

umbilical cord was torn out of the umbilicus during sudden expulsion of the child from the womb. The hæmorrhage was stopped by ligature.

Dr. Zober ('Mon. f. Geb.,' 1865) describes a case of bleeding from the umbilicus. It broke out on the 7th day. It ended fatally, although the bleeding was arrested by compresses.

Syphilis conveyed by vaccination. Drs. Chassaignac and Boinet ('Journ. f. Kinderk.,' xliv, 1865).—Chassaignac relates a case which seemed one of syphilis transmitted by vaccination. A child, two years old, presumed free from syphilis, was vaccinated on the 27th June. The vaccine-vesicles went through the ordinary course, but, after nearly healing, sores were found in the scars; the sores had a hard base, and the glands in the axillæ were swollen. A copper eruption appeared on the chest.

There is also an elaborate report on this subject in the same journal, addressed to the French ministry. Dr. Roger also contributes (see same journal and 'Union Méd.,' 1865) clinical studies on infantile syphilis. He relates cases, and gives the following summary:—1. There is an example of the gradual and natural weakening of the syphilitic diathesis in the course of several consecutive pregnancies in a woman who contracted syphilis during her first pregnancy. 2. In most cases where syphilis is communicated from the suckling to the nurse there are mouth affections of a syphilitic character in the former. In suckling there certainly arise conditions which may bring about infection through the secretions of the mouth; so may repeated and protracted sucking produce cracks on the lips and tongue of the child and on the nipples of the nurse; thus, syphilis may be inoculated, and especially by means of the saliva mixing with the poisoned blood. In other cases the discharge from the nose of a syphilitic child may be the medium of infection to the nurse. 3. In the case where syphilis appears simultaneously in nurse and child the fact that the disease first appeared on the nurse's nipple is evidence that the syphilis was transmitted from the child; on the other hand, the absence of affection of the nipple, and the presence of syphilitic symptoms elsewhere, justifies suspicion that the nurse was first affected. 4. There are observations (related) which prove that syphilis may be acquired by children by kisses or other inward contact. 5. Syphilis is no impediment to the regular development of vaccinia. 6. The stated rareness of syphilis in new-born children is only true in excluding pemphigus and affections of the viscera which are of intra-uterine origin. 7. From a collection of 200 cases it follows that inherited syphilis discovers itself in nearly one half before the expiration of the first month, and in $\frac{2}{3}$ ths before the end of the third month after birth. If syphilis breaks out after the third month the probability is great that the disease is not inherited, and it is proper in selecting vaccine-lymph to take a child more than three months old. The presumption is very great that when tertiary symptoms appear in a child after its first year, and still more after the second, these are the sequelæ of an acquired, and not of an inherited, syphilis. 8. Easily seized marks distinguish syphilitic pemphigus from the simple. The situation of the bullæ on the palms and soles of the feet, and especially their early appearance, namely, at birth or in the first two months, are the characteristic signs. The same situation indicates also the syphilitic

nature of psoriasis and herpes circinnatus. Onychia in new-born children is a much more characteristic indication of syphilis than in adults. 9. The frequency, the very important significance of syphilitic coryza, is beyond doubt. Syphilitic laryngitis also occurs. 10. The rarity of bone diseases in infants makes the diagnosis between syphilis and scrofula as the cause difficult, on account of the frequency of rickets and scrofula at this tender age, especially since the two diatheses may coincide. Of swellings of the skull it may be said that in quite young children, as opposed to adults, they are much more frequently scrofulous than syphilitic. 11. The development of infantile syphilis is sometimes so rapid that in the same individual we may witness the occurrence of the different phases of the disease close together. 12. As regards the prognosis and curability of infantile syphilis, we must distinguish between the subjects coming into the world with syphilitic manifestations which, in all probability, carry disease of the internal organs, and those borne apparently healthy and only exhibiting symptoms after several weeks. The first fall certain victims, the latter generally recover quickly under a well-directed mercurial treatment. 13. A prophylactic treatment by mercury of children born of syphilitic parents gives little security; we must wait for the declaration of symptoms before proceeding to treatment. 14. Dr. Roger prefers the internal use of mercury to the external, and he has obtained excellent and quick results from the simultaneous use of Van Swieten's liquor, and sublimate-baths.

Dr. Devergie ('Journ. f. Kinderkr.,' vi, 1866) relates a case of a boy who was inoculated with syphilis by vaccination. In the discussion Ricord confessed that he had at one time denied the occurrence of this mode of infection, but he now recognised its reality, the cases in illustration being clear. Depaul supported the affirmative.

Dr. Richard Förster contributes ('Deutsches Archiv f. klin. Med.,' 1866) a paper on the treatment of *infantile syphilis*. He uses chiefly the protoiodide of mercury.

On *infantile syphilis*, see R. W. Dunn ('Brit. Med. Journ.,' 1865). Bouchut ('Journ. f. Kinderkr.,' xlvii, 1866).

On syphilis in infants. Lectures by Dr. A. Minich ('Giorn. Veneto di Sc. Med.'). Dr. Minich's work discusses—first, hereditary syphilis; secondly, acquired syphilis; thirdly, the treatment of both. He contends that the father may transmit at least secondary and tertiary symptoms independently of the mother's organism. He says all the children of a syphilitic father are not necessarily syphilitic. He does not admit that a fœtus already conceived and healthy can be infected through the mother's circulation by subsequently infected connections which leave the mother unaffected, nor that the syphilitic influence of a first husband can be extended through the mother, she remaining uninfected, to the progeny of a second husband.

Syphilis may be acquired by contact with the vagina, by lactation, and vaccination. He believes that infection by a primary sore on the nipples is real, but rare; but frequent by means of secondary affections of this organ. In the absence of ulcers on the nipple syphilis may be communicated by the milk. The infant, on the other hand, may transmit secondary syphilis to the nurse.

As to the transmissibility through vaccination, he insists upon the importance of separating children affected with latent syphilis from those that are exempt.

The vaccine fever, like all eruptive fevers, disposes to the development of latent syphilis. True vaccine syphilis only seems admissible when syphilitic pus or, still better, syphilitic blood is mixed with the vaccine-lymph, and when the vaccine-scab, falling after 20 or 25 days, the true infecting ulcer, followed after some months by the symptoms of constitutional syphilis, appears.

On syphilitic diseases of the skin following vaccination. G. Nayler ('Brit. Med. Journ.,' 1865).

A discussion in the Academy of Medicine discloses the opinions of Depaul, Roger, and others, on the subject of *early vaccination*. Depaul thinks vaccination before 3 months is not more dangerous than later. Rogers says erysipelas is by no means rare when it is practised before 3 months, but says this accident is due more to the number of punctures than to the tender age.

Drs. Lanfranchi and Faure report their experience of a novel mode of variolous inoculation ('Journ. de Méd. et de Chir. prat.,' 1865). Having observed, during an epidemic in Ajaccio, that smallpox was as fatal amongst the vaccinated as amongst others, they concluded that the preservation power of vaccination was exhausted, and they found that even revaccination was not protective. They, therefore, resorted to the following modified form of inoculation. They insert in a puncture in the arm a minute quantity of fresh variolous matter taken from a patient; into the same puncture they insert a little fresh cream from cow's milk, then apply some more cream over the puncture, and let it dry. They affirm that in very many children thus treated the variola was most benign, and that the patients were protected against reinoculation.

Zymotic Diseases.

The *croup*. Dr. Paoli (Würzburg, 1865).—The following are the conclusions set forth by Dr. Paoli:—1. From historical indications it seems probable that the modern croup differs from the malignant and gangrenous angina of old physicians, inasmuch as the first is a general affection, with prevalent epidemic and contagious manifestations in the neck, whilst the second is a local epidemic or contagious disease, limited to the upper part of the air-passages.

2. That the pseudo-membranes which most probably accompanied the gangrenous angina escaped observation or description.

3. Diphtheritis is a specific general disease, characterised by great prostration, acute fever, swelling of the spleen and submaxillary and cervical glands, accompanied by pseudo-membranes of the mucous membrane of the air-passages, albuminuria, and paralysis. It is contagious, but not by direct communication, like syphilis or hydrophobia; it may be developed primitively. The pseudo-membrane is characteristic and diagnostic of croup. Croup is a local diphtheritis, chiefly affecting children from 2 to 8 years, limited to the throat, larynx, and contiguous passages, analogous to primitive syphilitic ulcer, capable, like this, of causing a general affection, but differing in this, that the conta-

giousness of croup depends upon epidemic circumstances. Croup is not hereditary, and does not depend upon parasites. In the sporadic form croup begins in the pharynx, and it is only later that it spreads to the air-passages. Fits of suffocation, not due to foreign bodies fallen into the larynx, or to false croup, are the sure signs of false membranes in the larynx and pharynx. Croup, as croup, ends in death in a few days; but recovery is not tardy if the disease does not pass into general diphtheritis. Relapse is peculiar to pseudo-croup, rare in true croup. The croup which succeeds to the acute exanthemata in special hospitals and large towns, easily passes into true diphtheritis, becoming contagious, and creating an epidemic. Damp favours the development of croup. So long as false membranes are not formed in the larynx even the most severe kinds of diphtheritis may be cured; but when once the aërial stenosis has appeared broncho-pulmonary complications and the other peculiar morbid features of this fatal infection are quickly manifested. Bleeding and blisters are always dangerous. Emetics are useful. Calomel, cauterisation, laryngeal catheterisation, and tracheotomy are the resources.

On *croup*. By Dr. Abelin ('Journ. f. Kinderkrankh,' 1865).—Dr. Abelin describes an epidemic of croup in Stockholm. He prescribes bleeding; extols cold; does not advise mercurials; says sulphate of potash, antimony, chlorate of potash are very uncertain. He prefers local treatment, especially the inhalation of water-vapour with a little vinegar; sometimes bromine or iodine are useful. He thinks well of emetics. He insists upon the supply of fresh air.

The following memoirs on diphtheria may be consulted:—By Dr. Greenhow; Dr. Greve, describing an epidemic in Namdalun, in Norway, 1860-1; by Dr. Hallin, describing an epidemic in Fahlun, in Sweden, in 1861-2; by Dr. O. Neyber, describing an epidemic at Wisby, Sweden ('Journ. f. Kinderk.,' xlv, 1865).

On the epidemic puerile angina which reigned in Fonzaso in 1864 by Dr. Facen ('Gazz. Med. Italiana').—The epidemic diphtheritic angina described by Dr. Facen was preceded by measles, the travelling virus of which is easily absorbed by the lymphatic glands of the throat. In some cases it was associated with scarlatina. In some cases the angina put on the true diphtheritic character, with a tendency, if not contagious, in some degree epidemic (*sic*), without being preceded by any acute exanthemata. The author particularly directs attention to the external swellings of the glandular system seen in the subauricular regions.

There is a long and interesting discussion on diphtheritic paralyses in the 'Journal für Kinderkrankheiten,' 1865, in which Drs. Sée, Maignault, Trousseau, Gübler, and Roger, took part.

Dr. Thoresin relates his experience of the epidemic of diphtheritis in Norway from 1861 to 1864 in a very interesting memoir ('Norsk Magazin,' 1865, and 'Journ. für. Kinderkr.,' 1865).

Dr. Eug. Moynier illustrates the use of tracheotomy in the last period of croup by several cases ('Union Méd.,' Jan. 1866).

Tracheotomy in croup is elaborately discussed in its historical and other relations by Dr. Barbosa, of Lisbon (Acad. of Sciences, Lisbon, 1863).

Dr. Frideau ('Gaz. d. Hôp.,' Paris, 1866) speaks highly of the value of copaiva and cubeb in the treatment of diphtheria. His experience relates to an epidemic in Mayence, which destroyed 200 persons in a short time. It is reported that Trousseau has tried the remedies with good success.

On the question of croup and diphtheria, see Dr. Luzsinsky ('Journ. f. Kinderkr.,' xlv, 1866).—In this memoir Luzsinsky compares successively the symptoms of croup and diphtheria, and concludes that a distinction between them cannot be established; that the diseases are either the expression of the same morbid process, or, at the most, modifications of the same morbid process.

On an epidemic of *cerebro-spinal meningitis* (*Genickkrampf*). By Dr. Litten ('Journ. f. Kinderkrankh.,' 1865).—Dr. Litten describes an epidemic of cerebro-spinal meningitis which raged in Neustettin. The smallest of the children attacked were seized suddenly with vomiting. Then followed the tetanic retraction of the muscles of the neck, and sometimes the patients lost consciousness. Frequently the vomiting was not repeated, but the sopor was continuous; and if the patients got up for a moment it was only to express by gestures their suffering from spasm in the neck. The pupils remained contracted; the temperature somewhat increased, trismus, grinding of the teeth, quick pulse, soft abdomen, bowels alternately relaxed and costive. Death came in from twelve to twenty-four in convulsions, or by paralysis. If the senses returned, although the opisthotonos remained, a free reaction was established, which lasted a long time before arriving at recovery. Some cases were preceded by fugacious exanthemata on the arms, legs, and chest; others by tonsillary swelling, vague articular pains, and not rarely towards the end there was anasarca or œdema, with albuminuria. In all there was observed a peculiar dark tinge on the skin of the upper and inner part of the thighs, with a characteristic want of elasticity and a pulverulent desquamation.

Scarlatina prevailed during this epidemic, and there appeared to be pathological relation between the two diseases. Fugitive scarlatiniform eruptions occasionally appeared during the course of the cerebro-spinal affections. The sequelæ were those of scarlatina—arthralgia, hydrocephalus, œdema, albuminuria.

Dr. A. Steffen relates his experience in the use of inhalation in *convulsive cough* ('Journ. f. Kinderkr.,' xlv, 1866). He refers to the reports of Lochner, Commenga, Blacke, Bergeron, Barthez, Roger, Manigault, on the inhalation of the fumes arising from the lime used in purifying coal-gas as a remedy in whooping-cough. He relates cases in which he resorted to inhalations of water-vapour, of a solution of common salt, either alone or with tincture of opium, and of tannin with laudanum. He gives the preference to the latter, but speaks of the vapour of turpentine.

See also J. Robertson ('Med. Tim. and Gaz.,' Jan. 1865).

Abdominal typhus in children, and especially alalia. Dr. Friedrich ('Journ. f. Kinderkr.,' xlv, 1865).

Dr. Bouchut gives an interesting memoir on *aguc* in infants ('Journ. f. Kinderkr.,' xlv, 1865). A nurse-child was brought to the "Enfants Malades" from the district of Sologne. Referring to a previous case

which first attracted his attention, which also came from Sologne, a marshy tract where ague is prevalent, he says it was brought in with purpura over the whole body, and a very distended belly, chiefly due to enlargement of the spleen. Another feature was that, in irregular alternations, the child got worse or better. The child was cured by quinine. Bouchut insists upon the importance of early diagnosis, because, if not detected and properly treated, ague is quickly fatal to infants. It rarely assumes the regular stages of cold, heat, and sweating; and the younger the child the more are these stages intermixed. Rigor scarcely ever exists; the child becomes only blue or greenish-white from head to foot, and the nail-ends become blue. This period of "concentration" lasts about an hour; then comes the period of "expansion," which is manifested by a rosy colour of the skin and burning heat; then sweating, which is never so marked as in adults. The periodicity is also modified. The fits assume a variable type, but approach the quartan; they recur daily, but very irregularly, at different hours. When this fever has lasted several weeks or months the consecutive anæmia appears, and the child has the greenish-yellowish colour characteristic of paludal infection, and so common in Sologne. With or after the anæmia comes the cachexia, with emaciation, general debility, enlargement of the belly, especially in the region of the spleen. In much protracted miasmatic poisoning purpura or hæmorrhagic spots extend over the skin. At this stage the indication is to counteract the tendency to death. In connection see a case of congenital extreme tumefaction of the spleen by Dr. Hawalka ('Wien. Med. Wehnschr.' 1865).

Dr. Bouchut ('Journ. f. Kinderk.,' xlv, 1865), reverting to the difficulty of diagnosing *hooping-cough* except by the coughing fit, says there is a sign which, when present, is as characteristic of hooping-cough as are the wounds in the tongue of epilepsy, namely, the ulcerations of the *frænum linguæ* and neighbouring parts. These ulcerations, from their entirely mechanical origin, have a great analogy with the tongue-bites of epilepsy. The ulceration appears as a rather large, somewhat grey, sore of the frænum, and, in addition, there are found on the under side of the tongue one or more phlyctenæ, somewhat oval. This condition has been noticed by several writers in Germany and Italy since 1544.

Diseases of the Nervous System.

Violent chorea cured by frictions, kneading, and methodical gymnastics. By Prof. Blache ('Journ. f. Kinderk.,' xlv, 1865).—Dr. Blache reports three severe cases of chorea cured in the Children's Hospital, Paris, by rubbing, kneading, and gymnastics, under the recommendation of M. Laisné, professor of gymnastics. True, the children had, in addition, sulphur baths, iron, and quinine, fresh air and nourishing food.

On the different forms of stammering, and the rational methods of treatment see Dr. E. Schutz ('Journ. f. Kinderkr.,' xlvi, 1866).

On the simulated diseases of children. By Dr. Rosanelli ('Gazz. Med. Italiana').

Diseases of the Intestinal Canal.

On intestinal invaginations in early childhood. By Dr. W. Thomas, of

Ohrdruff ('Journ. f. Kinderk.,' xlv, 1866).—He relates several cases ending fatally, with the post-mortem examinations. The symptoms were sudden onset of the illness, violent painful shrieking, twisting and writhing of the body, discharge of blood or bloody mucus from the bowel, with preceding violent straining; vomiting, often very profuse, of chiefly clotted milk and mucus, very seldom of fecal matter; in most cases small, hard, abdominal swelling near the navel; expression of deep depression; hollow, sunken eyes. The duration of the unfavorable cases was from 4—5 days; in recovery, from $1\frac{1}{2}$ —4 days. The most constant symptom was vomiting; as constant was the blood evacuation.

Treatment of prolapsus recti in children by subcutaneous injection of sulphate of strychnia. Dr. Foucher ('Journ. f. Kinderk.,' xlv, 1865).—To cure prolapsus recti Dr. Foucher has used a solution of 20 centigr. of sulphate of quinine in 20 grammes of water. Ten drops of this solution are injected in the direction of the sphincter ani.

C. Binz, of Bonn, contributes a case of, and observations upon, *perforating ulcer of the stomach in new-born children* ('Berlin. Klin. Wchnschr.,' 1865).

On the origin and significance of intestinal gases in new-born children. By Prof. Breslau ('Mon. f. Geburtsk.,' July, 1866).

Dr. C. Binz describes ('Virch. Arch.,' 1866) cases of *fatal jaundice* in new-born children, caused by obliteration of the gall-ducts.

Dr. Mettenheimer (1866) relates cases in which it seemed that aphthæ were caused by the use of caoutchouc artificial nipples.

Dr. Guersant ('Journ. des Connaiss. Méd.,' 1865) describes the forms of vulvitis in young girls; these are—the simple, the diphtheritic, the ulcerous, the gangrenous, the syphilitic.

Diseases of the Chest.

Attention is directed to an elaborate memoir on the *pneumonia* of children by Dr. H. Sahmen ('Petersb. Méd. Ztschr.,' 1865).

Dr. Guinier, of Montpellier ('Gaz. Hebdom. de Méd.,' 1866) discusses the practice of paracentesis of the chest in very young children, and relates a case.

On certain diseases of infancy and childhood. By Dr. Pasquali, of Rome (Genoa, 1865).—The work of Dr. Pasquali is an elaborate memoir on tuberculosis in children.

Some cases of spasmodic cough attending tuberculosis of the bronchial glands are narrated by Verliac ('Gaz. des Hôp.,' 1865).

Dr. R. Ferber ('Arch. d. Heilk.,' 1866) discusses the pathology of *diseases of the heart* in infancy, especially *cyanosis*. He shows that these abnormalities are sometimes preceded by inflammatory action.

Dr. A. Brunniche adds to a previous memoir on the subject ('Bibliotek f. Laeger,' 1864) an interesting history of a case of cyanosis in a child ('Journ. f. Kinderk.,' xlv, 1865).

Attention is directed to a series of memoirs by Dr. S. Pappenheim, of Berlin, on the diseases of children in China. These memoirs describe skin diseases and zymotic diseases prevalent in that country ('Journ. f. Kinderk.,' xlv, 1865).

Dr. Jos. Bierbaum publishes ('Journ. f. Kinderk.,' xlv, 1865, xlvii, 1866) memoirs on diffuse ascites, intermittent fever, inflammation of the

hip-joint, concussion of the brain, eclampsia, urticaria, miliaria, chronic vomiting, eclampsia, meningitis, intestinal catarrh, bronchitis, tuberculosis, Bright's disease, hydrocephaloid, jaundice, pseudo-croup.

On the dropsies of childhood. By Dr. Pasquali ('Annali Univ. di Med. Milan,' 1866).

Post-scarlatinal dropsy, without albuminuria. G. Stevenson Smith ('Dubl. Med. Press,' 1866) relates three cases.

New observations on subcutaneous emphysema. Dr. H. Roger ('Journ. f. Kinderk.,' 1865).—Dr. Roger has explained the occurrence of emphysema in children. As in herbivorous animals emphysema may arise from wounds in the alimentary canal, which admit air into the cellular tissue, so in man. Damarquay relates a case in which emphysema followed an operation for fistula in ano. The natural opening of the anus being closed by adhesions, the gas in the intestine was forced into the cellular tissue of the perinæum and thence upwards under the skin of the abdomen. Roger relates a similar case. After death two perforations of a tuberculous nature were found in the cæcum.

The following relate to the rearing of infants :

Dr. A. M. Ballot ('Nederl. Tijdschr. v. Geneesk.,' 1865) advocates buttermilk as food for infants. In this he follows the practice of Prof. Simon Thomas. The advantages contended for are the greater digestibility and the more easy preparation than Liebig's artificial milk.

Dr. Robert Küttner, of Dresden ('Journ. f. Kinderk.,' xlv, 1866) contributes a memoir on the appetite and food of infants. Dr. van der Corput ('Journ. de Méd., &c., Brux.,' 1866), adverting to Liebig's artificial milk, says it is to the real milk no more than what a dead body is to the living one. A milk more resembling human milk may be prepared by adding to one pint of cow's milk 15 grammes of white sugar and 0.50 centigramme of bicarbonate of potass.

On the nourishment of new-born infants. See an article, 'Journ. f. Kinderkr.,' xlvii, 1866.

On the artificial rearing of children by milk. By Dr. Falger ('Virchow's Archiv,' 1866).—Dr. Falger refers to the researches of Dr. v. Hessling ('Virchow's Archiv) and Pasteur as to the ready development of fungi in milk. He cites the observations which show that the casein in stale cheese was gradually lost, until, after some months, as the "cheese ripened," the nitrogenous element had entirely disappeared, and the cheese had turned into fat. He shows that fungi easily get into milk, and not only impair its digestibility, but, by being transported to the mucous membrane of the mouth of the infant, become developed in the aphthous secretion. He adverts to the numerous experiments made to secure milk from turning sour, and shows the unsatisfactory result. His aim was to obtain milk as nearly as possible in the natural condition, and especially to give it as quickly as possible after milking. But to get fresh milk several times a day is difficult. He therefore sought to preserve the milk from access of oxygen, and to keep it at the same temperature as it had before milking. In the case of a premature child, which was falling off from bad nourishment, with aphthous sores in the mouth, colic-like

pains, sour undigested stools, excoriation of the nates, shrivelled skin, flaccid weak limbs, and aged aspect, he recovered it by this expedient. Fresh milk was drawn three times a day, in two bottles, quite filled, and well stopped with clean corks. The milk of one of these was given, diluted, at once, whilst the other was kept in a sand-bath, at the temperature of blood, to be used when wanted. In this manner the child rapidly recovered. Other experiments were equally successful.

On food for infants, see Liebig (Lond., 1866).

There is a memoir on the *mortality of infants* by Dr. Teuptang ('Journ. de Méd., &c., Bruxelles,' 1866). He discusses chiefly the choice of nurses. The same subject is illustrated by MM. Odier et Blache fils ('Gaz. Méd. de Lyon,' 1866). They insist upon the importance of submitting to official inspection infants put out to nurse, and, as the most accurate method of determining how far they are cared for, they propose to weigh them—1st, on delivering an infant into the charge of the nurse, the weight being certified on a ticket; 2nd, this stated weight is to be registered in the village-book; 3rd, a physician is to weigh every week and register his results. Out of 286 infants Odier and Blache found that 115 gained, 143 lost weight, and 28 had remained stationary.

Treatises on popular hygiene for children. By Dr. L. Ripa (Milan, 1865).

Therapeutics.—On the therapeutic use of milk containing various medicines ('Union Médicale,' 1865). Dr. Bouyer has used milk containing iodine, iodide of potassium, arsenic, mercury, and iron, with satisfactory results. He extols this method of combining remedies with aliment for young children. The preparations of iodine are iodic milk-syrup, iodic milk-powder, iodic milk-chocolate. Mercury and iron are similarly combined. Cases are related illustrating the use of preparations.

On the use of mineral springs in certain diseases of childhood. By Prof. Abelin, of Stockholm ('Journ. f. Kinderkr.,' xlv, 1866).

REPORT
ON
MEDICAL JURISPRUDENCE.

BY
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Poisoning.

IN an essay on the subject of poisoning, M. Tardieu* discusses various questions which arise in medico-legal inquiries from a point of view which differs from that ordinarily adopted. The most interesting part of his paper appears to be that in which he discusses the question whether it is necessary that the medical jurist should be able to determine the exact nature of the substance which gave rise to illness or death in the particular case under inquiry. "If the fact of poisoning," he says, 'has been established . . . it seems to be at least superfluous to inquire what was the poisonous substance. If the death of a person is the result of injuries to the head, fracturing the skull, it would appear to be a matter of no importance, or at least of secondary importance, to determine with absolute accuracy what instrument produced the wounds. Yet there is not the least difference in this respect between such a case and one of poisoning. Indeed, whereas the exact determination of the weapon may often aid in the discovery of the murderer in a case of assassination, it is very rare that the nature of the poison used adds in any way to the elucidation of a poisoning case. But," continues M. Tardieu, "so artificial and opposed to common-sense is the construction

* "Étude médico-légale sur l'empoisonnement," 'Annales d'Hyg.,' 2ème sér., xxiii, p. 108. The essay in the 'Annales d'Hygiène' consists merely of certain chapters of the complete systematic work on the subject since published by M. Tardieu.

of what is termed *toxicology*, that questions of poisoning have been supposed to be governed by rules of their own. By a very strange abuse of language the *corpus delicti* has been looked for, not in the bleeding corpse or in the fractured skull of the victim, but in the weapon employed by the assassin. It has been supposed necessary to extract and exhibit the poison, instead of investigating the case in order to prove that it was one of poisoning."

He then goes on to show that this accords perfectly with the tendencies of the public to be convinced by the evidence of the senses, but to be unable to draw conclusions by means of the intellect. He insists particularly on the fact that arsenic, copper, and mercury, were formerly supposed to be almost the only poisons which were practically employed, these being the very poisons which are most readily demonstrated in the metallic form by chemical processes. But it is as impossible as it would be unwise to extend this principle, and to apply it to other substances. If a person has been poisoned by nitric acid or sulphuric acid, how is the chemist to isolate the *corpus delicti*, and to exhibit it in a pure form? And, if this has been done, how are the jury to distinguish a drop of one of these acids in a test-tube from a drop of water? A similar difficulty occurs in cases of poisoning by phosphorus or by lucifer matches; and especially when any organic substance, such as one of the alkaloids, has been employed as a poison. At the same time M. Tardieu recognises the value of determining the nature of the poison, as aiding in the explanation of the symptoms from which the patient may have suffered.

The following notes refer in part to cases of poisoning recorded during the past two years, and presenting (as I think) sufficient interest to make it necessary that they should be added to those which form the basis of the received views upon the subject; in part to papers containing new facts with reference to the morbid changes produced by the different poisons.

The notes are arranged in the order most generally adopted, the inorganic poisons being taken first.

Phosphorus.—Prof. Virchow* has shown that the stomach is not unaffected in cases of acute poisoning by phosphorus, as had been supposed to be the case by the most recent writers on this subject. It is true that there is often no redness of its surface; but on careful examination the gastric glands are found to have undergone a change which is perfectly similar to the "cloudy swelling" which occurs in the kidneys in the same cases. The mucous membrane is, in fact, thickened, though not strikingly so. It is less transparent than natural, and is sometimes of a whitish, sometimes of a slightly greyish or yellowish-white colour. In fine sections the glands are found to be the structures essentially concerned. They are enlarged, their epithelium fills their cavities, and the individual cells are filled with a finely granular mass. At a later stage the epithelial cells contain distinct fatty granules, and they ultimately soften and break down into a granular detritus.

* 'Archiv f. path. Anat. u. Phys.,' xxxi, p. 399.

Virchow proposes to give the name of *gastritis glandularis* or *gastro-adenitis* to this affection.

Arsenic.—Saikowsky* has found that arsenic and antimony produce the same pathological changes as phosphorus. After the administration of these substances morbid appearances were found in the liver and kidneys, as well as in the muscular substance of the heart and of the diaphragm. He has made 46 experiments on rabbits, which have yielded uniform results.

Arsenic was given in the form of arsenious and also of arsenic acid. Small doses were employed, so that the animals lived from 3 to 6 days. The liver was always found to be considerably enlarged and very fatty. The fat was not diffused throughout the substance of the organ. In each acinus 3 zones were distinguishable—an external, of a pale red colour; a middle zone, of a dull yellow colour; a central zone, of comparatively trifling extent, and appearing as a reddish point. Microscopical examination showed that it was in the middle zone of the acinus that the cells were enlarged and filled with fat-globules of various sizes. The kidneys were much enlarged, the tubuli were completely filled with fat-globules, and wherever the epithelium still existed its cells also were full of similar globules. The muscular fibres of the heart and of the diaphragm had likewise undergone a fatty change. The epithelial cells lining the glands of the gastric mucous membrane were often enlarged, and sometimes contained a quantity of fat. All these morbid appearances were much more marked after the administration of arsenious acid than when arsenic acid was given. The quantity of fat contained in the liver was considerably greater in rabbits poisoned by arsenic than in those poisoned by phosphorus. When large doses of arsenic were given to rabbits ($1\frac{1}{2}$ to 3 grains of arsenious acid), so as to kill them in 20 to 28 hours, the liver was found to be fatty; but the fat was diffused throughout the substance of the organ, so that the change was not so definite as in the more chronic cases of poisoning.

Very similar appearances were produced by the administration of antimony, especially when the terchloride was used (in a dose of $\frac{3}{4}$ grain to $1\frac{1}{2}$ daily, for 3 or 4 days). In such cases the changes in the liver were precisely similar to those produced by arsenic, except that they were more diffused, and affected more uniformly the whole structure of the organ. The quantity of glycogen was always found to be diminished in these experiments, and sometimes this substance was altogether absent.

The statements of Saikowsky were shortly afterwards confirmed by clinical observation in a case of arsenical poisoning in the human subject, recorded by Grohe and Mosler,† of Greifswald. A healthy boy, 2 years old, put into his mouth a piece of green paint, about 10 a.m. Within 20 minutes vomiting came on, the vomited matters being of a green colour, and very abundant. Arsenic was detected in them. The child became much collapsed; the respiration was rapid; the pulse small, and not to be felt distinctly at the wrist; the abdomen

* 'Virchow's Archiv,' xxxiv, p. 73.

† Ibid., p. 208.

distended. In the afternoon, when reaction came on, the region of the stomach was tender, and pressure was followed by nausea and inclination to vomit. The child was very restless, and suffered from severe thirst; the urine and fæces were passed involuntarily. About 7 o'clock in the evening the collapse returned. Afterwards slight improvement in the symptoms again took place; but this was not maintained, and death occurred at 3 a.m., 17 hours after the ingestion of the poison. A chemical examination of the contents of the stomach and intestines was made, but no arsenic was detected, either in them or in the spleen, liver, bile, or kidneys.

In the gastric glands were found changes which coincided perfectly with those described above, as having been observed by Virchow in cases of poisoning by phosphorus (gastritis glandularis, gastroadenitis).

The kidneys also presented morbid appearances. The tubes in the cortical substance were opaque and finely granular, and their epithelial cells could not be isolated. No fibrinous casts were discoverable in the interior of the tubes. A similar morbid condition existed in the liver. The cells in the periphery of the lobules contained fatty granules, which were present only in small numbers in the cells lying nearer the intra-lobular veins. The muscular fibres of the heart, especially of the left ventricle, were likewise granular. They were soft, so that it was unusually difficult to isolate them. The degree of the granular change varied at different spots, so that every stage of it could be recognised. It was most intense in a patch of hyperæmia and ecchymosis, which existed in the septum. At this point the fibres immediately beneath the endocardium were found to be completely broken down, and it appeared as if rupture of them had taken place, for blood-corpuscles were observed mixed with the granular matter.

In the diaphragm, again, similar morbid changes were observed, the muscular fibres being found in every stage of degeneration, from the slightest turbidity to complete breaking down of their structure. The fibres which were most altered were decidedly enlarged, being nearly twice their natural diameter. Very slight changes were also found in some of the fibres of the pectoralis major, and of the adductors of the thighs.

Prof. Maschka* records a case of poisoning by arsenic, in which recovery took place, although 5 grains of arsenious acid were found in the matters vomited.

In the 'Lancet,' 1866, ii, p. 336, will be found a short account of the "Ponteland Poisoning Cases"—a series of cases of poisoning by arsenic, remarkable from the predominance of nervous symptoms. At Donkin's Farm, Ponteland, lived three brothers of the name of Bushby, their nephew, a housekeeper, and a female servant. In the course of a few weeks, beginning about the end of December, 1865, all these persons (? with one exception) were attacked with similar symptoms, the principal of which were the following:—Vomiting; a peculiar intensely white fur on the tongue; congestion of the conjunctivæ; tingling and numbness of the feet and hands; and paralysis, especially of the lower

* 'Vjhrsschrift. f. ger. Med,' N. F., ii, 1865, p. 51.

limbs. These symptoms were constantly recurring ; they would subside for a few days, afterwards returning with fresh severity. The three brothers Bushby all died within 6 weeks. The housekeeper and others of the household were at the end of August still suffering from more or less paralysis of the legs ; and Mrs. Bushby, who had come to the farm to nurse her brother-in-law, was a perfect cripple. The disease was at first supposed to be diphtheria ; but the body of one of the brothers having been exhumed, arsenic was readily found in various organs. It was not discovered whether the poison had been administered intentionally or taken by accident.

Copper.—Dr. Taylor* records the circumstances of an inquiry which arose in July, 1866, concerning the cause of the illness of several persons belonging to a family at Itchen Abbas. It appears that some gravy, which had been made for a joint of veal, was left in a copper stewpan all night. The vessel had a tin lining, which had been a good deal worn, but it was quite clean when the meat was put into it. The cook declared that she drank about a table-spoonful of the gravy in the morning, and observed that it had no particular taste or smell about it. The veal with the gravy was served up in the dining-room, and was afterwards brought into the kitchen. After a considerable interval (about 12 hours) several members of the family and most of the servants were taken ill with similar symptoms, consisting in vomiting, diarrhœa, shivering, &c. It appears that only those who partook of the gravy became ill. Some of the servants who ate the veal without the gravy escaped altogether. Recovery took place in every case. Some of the veal with the gravy was, however, sent to an old man, aged 90, the grandfather of one of the servants. He had been ill some months before, but was well when he received the meat. The veal sent to him was separated from the gravy. The latter was given, at 11 a.m., to some children, who were taken ill the same night with vomiting and purging. The dry meat was eaten by the old man for his supper. About 9 or 10 hours afterwards he complained of feeling poorly, but he was not taken with severe symptoms until after breakfast the next morning. Purging then came on, which lasted all day. On the following morning he was sick ; he suffered from pains in his inside for nearly 3 weeks, at the end of which time he died. Post-mortem examination showed that there was "disease of the right lung, which was solidified and shrunk." The stomach was healthy. There was a large ulcerated patch in the middle of the duodenum. The lower part of the ileum presented numerous ulcers, and there were some also in the colon. The stomach, portions of the intestines, and the liver, were analysed, but no poison was found in any of these organs.

Dr. Taylor shows that the symptoms and post-mortem appearances in the case of this old man were rather those of disease than of poisoning by any metal. The deceased was proved not to have taken the gravy, which was impregnated with copper ; but Dr. Taylor thinks that there may have been sufficient poison in the meat to excite increased irritation, assuming that the bowels were already in an inflamed state. The failure of the chemical analysis to detect copper is, of course, not

* 'Guy's Hospital Reports,' 3rd series, xii, p. 329.

opposed to this supposition, for the quantity taken must have been small, and it is not likely that any of it would have remained in the intestines for 19 days.

Dr. Taylor is of opinion that the symptoms observed in the other cases were, in all probability, due to the presence of chloride or subchloride of copper in the gravy. The gravy was observed to be of a darker colour than usual, but it is remarkable that no peculiar taste was noticed.

The cases above related bear a strong resemblance to some instances of poisoning by food cooked in copper vessels recorded by Orfila. In these last, as in those reported by Dr. Taylor, the symptoms were delayed much longer than is generally the case in irritant poisoning. In some cases the effects did not show themselves until the day following the meal which was supposed to be their cause.

Mercury.—Dr. Moos* publishes a case of poisoning by the cyanide of this metal. The patient recovered. The case is of interest, because only two instances of poisoning by this substance are known to have occurred previously.

Dr. Michel Peter† records a case of poisoning by one of the little cones sold under the name of "Pharaoh's Serpents," which, as is well known, are made of the sulpho-cyanide of mercury. A young man, aged 19, swallowed one of these cones, supposing it to be a bon-bon. The taste at once showed him that he had made a mistake, but he tried in vain to induce vomiting. He at once felt pain and sensations of heat in the œsophagus; and he also suffered from difficulty of swallowing, nausea, and a burning pain in the region of the stomach. An emetic was administered, which gave rise to vomiting, and this afforded some relief. The symptoms, however, soon returned; the patient became pale and very weak; his skin was cold; he shivered repeatedly, and complained of a disagreeable metallic taste in his mouth. The pain in the stomach increased whenever anything was swallowed. When Peter first saw him, at the end of 4 hours, he deemed it best to administer lime-water, with the object of decomposing any sulpho-cyanide that might remain, and converting it into an insoluble oxide of mercury. This treatment quickly relieved the nausea, and hot fomentations to the abdomen diminished the pain. The next day the patient felt perfectly well; but it is noted that about noon he passed a tœnia a yard long.

Dr. Edwards publishes‡ two cases of poisoning by mercuric methide. The first case is that of a German, æt. 30, one of the assistants in the laboratory at St. Bartholomew's. The history of this patient is as follows:—He had had epilepsy as a child, and had also had fits since. For nearly three months he had been engaged in the preparation of mercuric methide. During this time he had complained of impairment of sight, but no abnormal condition could be detected by the ophthalmoscope. A month ago he had been seized with a fit, and since then he had not quite recovered his speech. Two days before his admission he

* 'Virchow's Archiv,' xxxi, p. 117; 'Schmidt,' 125, p. 174.

† 'Union Méd.,' 110, p. 525, 1865; 'Schmidt,' 128, p. 294.

‡ 'St. Bartholomew's Hosp. Rep.,' 1865, i, p. 141.

was affected with numbness of the hands, deafness, and general weakness, and noticed that his gums were sore. On admission, Feb. 3, 1865, his urine was found to be albuminous, and to contain triple-phosphate crystals and casts.

His symptoms quickly increased in severity. He became more deaf, and he had more and more difficulty in understanding what was said to him. He slept very badly. His countenance became duller. He had less power in his hands, the fingers being drawn together, and stretched out unnaturally. His gums became swollen and spongy, and a distinct mercurial fœtor arose.

On February 8 he was so restless and noisy that his hands had to be strapped to the bedstead. He muttered incoherently, refused to take nourishment, and became furious when any attempt was made to force him to drink. He gradually grew weaker; and on the 11th it was remarked that he did not move the left side, in which sensation also became lost. The left wrist was rigid, and the left knee almost entirely so. He remained completely insensible until his death on the 14th. The post-mortem examination threw very little light on the case. The brain was intensely congested and œdematous. The kidneys were congested, and the left one was ecchymosed.

The second case is that of a man, æt. 23, admitted on March 25, 1865. He also had been an assistant in the same laboratory, but had been engaged in the preparation of the methide for a fortnight only in January, since which time he had not worked at that or any other mercurial compound. During the illness of the other assistant he had stated that he felt weak, and had complained of soreness of the gums, looseness of the teeth, dimness of sight, painfulness and redness of the eyes, giddiness, nausea, and vomiting. About the beginning of March he was obliged to give up work, being too weak to walk about. His taste became imperfect, all things tasting alike, and a week before his admission he quite lost his hearing. His hands also became numb, and three or four days before admission his feet also were affected.

On admission he was quite conscious, but very deaf. His sight was much impaired, and his speech very imperfect.

His condition altered very slowly. He sometimes passed his urine under him and his motions into the bed. His swallowing at one time was impaired, and he became unable to speak. He moved his limbs imperfectly and slowly. His intellect became more dull.

On April 24 it is noted that he was becoming gradually thinner; his skin was slightly jaundiced; he moved his arms about without object, and appeared to be slowly losing both sensation and motion in his limbs; he swallowed with more difficulty, and could not protrude his tongue; his urine contained no albumen.

Afterwards he became restless, and even violent, shrieking out, trying to get out of bed, making loud, incoherent noises, laughing or crying in an incoherent manner. Violent movements in the limbs were at once brought on by touching his feet. He remained in nearly the same condition until within a few days of his death, which did not take place until April 7, 1866. During this long interval he occasionally gained flesh slightly for a time, but soon again relapsed. He was quite

idiotic, and recognised no one. The cause of death was pleuro-pneumonia of the left lung. The autopsy did not account in any way for the symptoms observed during his protracted illness.

A note by Dr. Odling states that mercuric methide is a colourless, heavy, inflammable liquid. It has a mawkish, ethereal smell and taste; but its odour, when diffused into the atmosphere, is extremely nauseous. It contains 87 per cent. of mercury. It boils at 93° Cent.

The close similarity of the symptoms in the two cases is in favour of their having been caused by the inhalation of the vapour of this substance; and this is confirmed by the fact that symptoms of the same character, though less in degree, were experienced by all those who worked in the laboratory at the time.

Prussic Acid.—Mr. Hickman* relates the following case of poisoning by prussic acid, remarkable from the fact that the dose was known, and that death occurred while the patient was under observation. The case was that of a porter at the Western General Dispensary, who took half an ounce of the acid by mistake for a dose of some medicine placed by him in a cupboard in which poisonous drugs were kept. He afterwards ran upstairs to the house-surgeon, traversing a distance of twenty-five to thirty paces, and ascending thirty-two steps. When he got into the house-surgeon's room he said, "Come down directly—I have taken half an ounce of prussic acid." He then ran all the way back to the dispensary, where he was found by Mr. Shone and Mr. Killingworth (who immediately followed him), standing unsupported in the middle of the room. He moved his hand impatiently, and said, "Be quick—give me something." Some solution of ammonia was given him, followed by some tincture of the sesquichloride of iron. He drank both these, and then, on being told to do so, put his finger in his throat to try to induce vomiting. This caused one or two slight but abortive efforts, after which he suddenly fell flat on his back, completely insensible. His face, previously pallid, now became much congested; the eyes were fixed and half closed; the pupils were somewhat dilated; no pulse could be felt; the breathing became slow, faint, and gasping; a frothy mucus exuded from between the lips; one or two of the respirations were accompanied by a slight stertorous sound. No convulsions occurred. Death took place in about ten minutes from the time of his first coming to the house-surgeon's room. In a few hours after death the face had regained its natural expression and colour, and it was noticed that it had the hue of health, and perfectly resembled that of one asleep. Subsequently, however, it became again congested, red, puffed, and ecchymosed; and a reddish fluid appeared at the nostrils. At the autopsy, thirty hours after death, the stomach was found partially contracted, containing about two fluidounces of a brown grumous material; the mucous membrane was markedly reddened all over the larger end of the organ, the redness being more decided along the rugæ. No odour of prussic acid was noticeable, except for an instant when the stomach was being divided. Its contents smelt strongly of ammonia, but on neutralizing them with nitric acid the characteristic odour became very evident. The mass also became of a deep blue

* 'Lancet,' 1866, i, p. 310.

colour, showing that ferro-cyanogen had been formed. At least a grain of anhydrous acid was found in the contents of the stomach. The fluid in the bottle from which the poison had been taken was ascertained to contain 1.48 per cent. of the real acid. Hence the dose of the poison swallowed must have been more than 3.5 grains of this acid.

Nitro-benzole.—Dr. Schenk* records a case of poisoning by nitro-benzole. The patient was a girl, æt. 18, who took about two drachms of this liquid (Essence de Mirban) with the object of committing suicide. She stated afterwards that she swallowed it without difficulty, and that she felt no ill effects for about a quarter of an hour. She then drank some coffee, and immediately afterwards nausea and vomiting came on. These symptoms were followed by giddiness, and before long by insensibility.

When seen by Dr. Schenk, apparently about three quarters of an hour after the poison had been taken, she was found unconscious, lying on her back, with half-closed eyes; she could not articulate properly, and answered questions in a disconnected manner, but she was sensitive to irritation of the skin and to the influence of pungent vapours. Her pupils were enormously dilated, and perfectly inactive. There were occasional tonic spasms of the flexors (especially of the upper limbs) and of the muscles of mastication. The skin of the face and neck, the mucous membrane of the lips and mouth, the tongue, and the nails, were remarkably livid. The face was also greatly swollen, so that the aspect of the patient was much altered. The eyes were prominent; the sclerotics livid; the conjunctivæ much injected. The pulse regular, 120 per minute; the respiration regular, but embarrassed. The small room in which she lay smelt strongly of bitter almonds, and her breath had a similar odour.

Venæsection was performed. The blood was viscid, very slow to coagulate, and of a brownish-black colour. The symptoms continued to increase, and at the end of an hour she was in a state of complete coma, with trismus, so that she could not swallow. After this her condition gradually began to improve. At the end of eight hours she could again answer questions, although feebly and in a rambling way. The spasms ceased, she fell into a quiet sleep, and after an hour she was considered almost convalescent. The next morning she was well, but the skin was still cyanotic. The breath no longer smelt of oil of bitter almonds. She recovered perfectly. She was five months advanced in pregnancy, and gestation was not interfered with by the action of the poison.

Strychnia.—The celebrated medical jurist, Prof. Maschka, of Prague, gives a detailed account† of the well-known case of Dr. Demme, who was tried for the murder of a merchant named Trümpy, of Berne. The evidence showed that death was due to poisoning by strychnia. There are many points of interest about this case, especially with reference to the question whether it was one of suicide or murder. On the night of Trümpy's death Demme slept in his room, and the account given by the latter of the circumstances attending the fatal event was as follows:—

* 'Vjhrsschrft. f. ger. Med.,' N. F., iv, p. 327.

† 'Prag. Vjhrsschrft.,' lxxxvi, p. 69.

About 2.30 a.m., Demme stated, he went out of the room for four minutes. When he returned he found that Trümper was drinking a glass of wine which stood near his bed. About ten minutes later, there having been no symptoms during the interval, Trümper suddenly called out, "I feel so tight, I cannot move my right side." Demme hastened to him and found him lying quietly; there was a sudden flush on his face, followed by a waxy pallor; slight convulsive movements of the lower limbs occurred; the expression became fixed, and he was dead.

On analysis strychnia was found to be unmistakeably present in the stomach and in the upper part of the intestinal canal, a greater quantity of it being discovered in the latter than in the former. Its total amount was estimated at about ten grains.

The medical men who made the autopsy declared that death arose from poisoning by strychnia, but that it could not have occurred in the way described by Demme. They asserted that tetanic spasms must have existed, and they inferred, from the fact that the stomach was empty, that vomiting must have occurred, of which no sign was discovered, either upon the corpse or in the room. From the extent to which the strychnia had passed into the intestines, they concluded that it could not have been swallowed immediately before death.

After detailing the facts of this cause célèbre, Maschka goes fully into his opinions concerning the various points which were raised. With reference to the cause of Trümper's death, he cannot, perhaps, be said to have formed an entirely unbiassed judgment upon the whole of the evidence, for he had twice been consulted at an early period of the case—first by Demme himself, and afterwards by Prof. Emmert. Still, his deliberate conclusions are undoubtedly to be received with great respect. The first point which he discusses is, whether, admitting that the death of Trümper arose from poisoning by strychnia, it is possible that the symptoms could have been such as were described by Dr. Demme. This question he answers in the affirmative. He insists on the fact that it frequently happens that animals, to which large doses of strychnia have been given, remain quite quiet for a time, and are then suddenly attacked by a spasm, in which they instantaneously die. In numerous experiments on rabbits and dogs, when strychnia was introduced into the stomach or beneath the conjunctiva, this single fatal spasm has not rarely occurred so suddenly, and has been of so short duration, that without very careful observation it might have been altogether overlooked. He has been informed by Dr. Struppi that the same thing was observed in one of four horses into whose veins strychnia was injected. Again, Dr. Korda related to him the case of a horse which received ten grains of strychnia in a pill, and which fell suddenly dead after two very rapid spasms.

In these cases Prof. Maschka thinks that death is not due to asphyxia, as in ordinary instances of poisoning by strychnia, but to spasm of the heart.

Cantharides.—Mr. Sedgwick* relates a case of poisoning by this sub-

* 'Med. Times and Gaz.,' 1864, ii, Dec. 10.

stance, attended with some peculiar symptoms. A girl, 13½ years old, ate a piece of tart into which a Spanish fly had been put. In half an hour she was attacked by giddiness, pain between the shoulders, and a burning sensation in the throat. She then suffered from vomiting of blood, and retention of urine, and afterwards from severe strangury. She also complained of a strong and disagreeable smell in the nostrils. It may be remarked that this peculiar odour, although it is not mentioned by Taylor, has been described by Beck as a frequent symptom of poisoning by cantharides. The occasional vomiting of blood lasted for 3 days. On the 17th day a very severe and long-continued epileptic attack took place; and 8 hours after this a second one, attended with hysterical symptoms; and these recurred during the next two days several times, at gradually increasing intervals. These attacks, with ischuria, continued for a considerable time, and 2 months after the swallowing of the poison she was admitted into St. George's Hospital, suffering principally from congestion of the kidneys. It is worthy of notice that the menses, which had previously appeared three times, did not return for 7 months.

The notes which follow have reference to the poisonous action of various gases and vapours:

Brenner records* a case which is undoubtedly of great interest, if the symptoms are correctly ascribed to the inhalation of phosphuretted hydrogen. The patient, a chemist, aged 28, had for 2½ years been occupied exclusively in preparing the hypophosphites. The room in which he worked was ill-ventilated, and he was exposed to the action of vapours containing phosphuretted hydrogen and phosphorous acid. After three months specks appeared in his field of vision, and grew rapidly larger, so that a month later he became unable to read. At the same time diarrhœa set in. These symptoms lasted for 9 months, when they were removed by medical treatment. His arms next became weak and uncertain in their movements, this being particularly troublesome when he was writing. His walk also became uncertain, and he suffered from shooting pains in the limbs and in the abdomen. The teeth began to crumble away, although he had no pain in them. He did not suffer from headache, giddiness, or tenderness of the spinal column. After a time he lost the power over the muscles of articulation, so that it was only by a powerful effort of the will that he could utter the words he wished. His swallowing also became slightly impaired. No history of excesses of any kind could be obtained. The appearance of the patient was quite that of a person affected with *ataxie locomotrice*. He was utterly unable to walk with his eyes shut, and fell directly he tried to do so. Under the influence of electricity the power of speech and the strength of the arms improved, but the weakness of the legs remained unaltered.

M. Fous-sagrives† gives an account of an occurrence which seems hitherto to have escaped notice—the generation of a poisonous gas within the boiler of a steam-engine which had been disused for some

* 'Petersburg. med. Ztschrft.,' viii, p. 245; 'Schmidt,' 127, p. 163.

† 'Ann. d'Hyg.,' 2ème série, xxiii, p. 241.

time. On the 31st October, 1864, the steamer *Bisson* anchored at Honfleur; the fires were put out, but a layer of 21 inches of water saturated with saline matters was left in the bottom of the boiler. The different openings into the boiler were closed. Its interior remained at a high temperature in consequence of its containing a pipe leading from a small furnace which was subsequently kept almost constantly heated. After the ship had been a month at Honfleur two men entered the boiler for the purpose of cleaning it out. They both at once became insensible, and a third man who came to their assistance likewise lost his consciousness, and lay half inside, half outside the boiler. By this time a certain quantity of pure air had been introduced into the chamber, so that the three men were removed without any further accident occurring, and they all ultimately recovered.

The first man who entered was the most severely affected. He was about 7 or 8 minutes within the boiler. He was unconscious and paralysed, his limbs falling by his side when raised. His face was red, and his lips bluish. His pupils were insensible to light, and no effects were produced by irritating the mucous membranes of the nose and throat. His respiration was at first completely suspended, according to the statements of those who were present at the time, and afterwards it was very infrequent (5 or 6 in the minute). The pulse was very feeble, and scarcely to be felt. The temperature was lowered.

Some importance is also attached to certain changes observed on the mucous membranes. The inner surfaces of the lips and the gums had a whitish appearance, being covered by a very thin pellicle, resembling that produced by a slight application of nitrate of silver. The eyes were half open; but on raising the eyelids the lower half of each cornea was found to present a sort of whitish coating, so that the corresponding part of the iris was not visible. The conjunctiva was injected and very red, especially at its lower part. Afterwards, when consciousness began to return, the patient kept his eyelids closed, as if the light pained him, and subsequently a conjunctivitis came on.

As respiration became again established convulsive symptoms were observed; the upper limbs became rigidly contracted; there was tetanic rigidity of the muscles of the back of the neck; the head was drawn powerfully backwards; the jaws were closed, and the teeth were forcibly ground together. After a quarter of an hour these symptoms subsided, and they were followed by jactitation of the limbs. Among the other effects noticed were aphonia (lasting 2 hours), aversion to take drink, and vomiting. The loss of consciousness continued for 22 hours. When recovery took place it was attended with febrile symptoms, so that the patient was bled. He also suffered from rather abundant diarrhoea, and from a stomatitis resembling very closely that produced by mercury. He was nearly well on the 5th day. In the other two men the symptoms were similar, but much less extreme; the second man was not insensible for more than an hour.

M. Bourel-Roncière, who investigated these cases at the time, concluded, from the fact that the mucous membranes presented the remarkable changes above described, that ammonia gas had been present in the air of the boiler, having been formed during the oxidation of

the iron. With the object of testing this hypothesis, one of the boilers of the ship *Le Dusquesne* was placed as nearly as possible under the same conditions as those which had existed in that of the *Bisson*. At the end of a month, however, the air in its interior contained no ammonia gas; it put out a candle introduced into it, but a cat placed within the boiler for 8 minutes suffered no obvious ill effects, although it uttered plaintive cries. (The boiler had, however, been opened for some time when the cat was introduced.) The air in the boiler of *Le Dusquesne* was found on analysis to present an excess of carbonic acid, and a diminution in the quantity of oxygen. It is, however, obvious that the conditions which existed in this case could not have been precisely those which obtained in that of the *Bisson*.

M. Fonssagrives, while agreeing in the view that ammonia was the substance which produced the caustic action observed in the case of the stoker of the *Bisson*, thinks that the sudden insensibility must have been due to some other body, probably one of those subtle poisons which are supposed to be engendered by the decomposition of organic matters, and which have not as yet been isolated by chemists.

Carbonic Oxide.—Several observers have recently devoted much attention to the study of the effects of the inhalation of this gas. It had been shown by Hoppe* and Bernard† that in contact with carbonic oxide blood acquires a bright red colour, with a shade of violet, and that it retains this colour for a long time. According to Bernard, the oxygen and some of the carbonic acid are expelled from blood by carbonic oxide, and blood saturated with this gas absorbs only a fifth part of the oxygen which would be taken up by the same quantity of normal blood. The power of coagulating remains unaffected. The blood-corpuscles retain their colour and their form outside the body for weeks; and when treated with oxygen or carbonic acid, or placed beneath the air-pump, blood containing carbonic oxide retains its bright hue; it does not become darker at once, even when decomposition sets in. It was maintained by Hoppe that these effects are due to the action of carbonic oxide gas on the hæmato-globulin.

After death by inhalation of carbonic oxide the blood forms with an equal quantity of solution of soda a thick mass of a bright red colour. But ordinary defibrinated blood forms a sticky black mass, which in thin layers is seen to be of a greenish brown colour.

Pokrowsky‡ has studied the action of carbonic oxide on animals, making them inhale air containing the gas in various proportions. When dogs or cats were placed in air containing 3 or 4 per cent. of carbonic oxide, they became restless after taking a few inspirations; in two or three minutes they began to utter cries of distress, lay down or fell down, and breathed very slowly and deeply. Tetanic spasms of the limbs, trismus, and quivering movements of the skin, were observed; the urine and feces were discharged involuntarily; the pupils became dilated, the eyes protruded, and death followed in from three to five minutes. In rabbits the tetanic spasms were still more severe. It

* 'Virchow's Archiv,' xi, p. 288.

† 'Leçons sur les effets des substances toxiques et médicamenteuses,' p. 157.

‡ 'Virchow's Archiv,' xxx, p. 525.

was noticed that in these animals distension of the vessels of the ears was the first symptom. Before death, in all these experiments, the respiration became very infrequent and deep; the pulse was infrequent, but not feeble; there was paralysis and general anæsthesia. Afterwards the respiration and the pulse ceased; but after this occurred life could be restored by using artificial respiration. When the air only contained 0.5 per cent. of carbonic oxide death did not take place till after two or three hours; the spasms were then slight, or even altogether absent; the respiration and the heart's action, however, were infrequent even in these cases. (It is necessary to observe that the carbonic acid exhaled during the experiment was removed by solution of potass.)

In these experiments, when the animals were opened as soon as complete paralysis had manifested itself, and while the heart was still beating, the venous system was found to be gorged with blood; the right heart was distended, the left empty and contracted. The pulmonary artery was much dilated; hæmorrhage into the lungs was found to have occurred at certain points, and in young animals the lungs were œdematous. All the vascular organs had a violet hue, and the blood was altered in colour.

Another symptom observed by Pokrowsky was a lowering of the temperature. Within half a minute after the commencement of the experiment the temperature fell one or two tenths of a degree Centigrade. After the gas had been in action for some time the temperature was found to have fallen 1 or 1.5° Cent., or even at length 2° or 3° Cent. The arterial pressure was also greatly diminished by the inhalation of carbonic oxide.

It had been supposed by Bernard that when recovery takes place after poisoning by carbonic oxide, the gas is exhaled by the lungs unchanged. It is shown, however, by Pokrowsky that this is an error. He endeavours to prove that the carbonic oxide is converted into carbonic acid before being exhaled.

Klebs* has published some interesting observations with reference to this subject. Three patients died within a short interval in the Charité at Berlin. The symptoms observed were unconsciousness, severe dyspnœa, lividity, and (in two of the cases) great rigidity of the muscles, and quivering movements. The blood was in general found to be of a very dark colour. It was only in the smaller vessels, and particularly in the pia mater, that it presented a cherry-red hue. The rest of the blood and the muscles were decidedly reddened by exposure to the air. All the vessels, even the capillaries, were remarkably full of blood. This was especially the case in the brain, lungs, liver, kidneys, &c. The branches of the meningeal arteries presented a peculiar tortuosity, which Klebs has never seen in young subjects under any other conditions, and which he is inclined to attribute to the action of the gas.

The muscles were found to have undergone remarkable changes in these and other cases of poisoning by carbonic oxide; and it is stated by Klebs that experiments on animals confirmed the opinion that these

* 'Virchow's Archiv,' xxxii, p. 450.

changes were due to the inhalation of the gas. Even in rapid cases the muscles no longer presented the yellow tinge which is natural to them. It seemed that this was replaced by a slight blue tint. When the action of the gas had been more protracted the muscles were found to exhibit a grey, dull appearance. These alterations seemed to affect the different muscles in much the same order as those observed by Zenker in typhoid fever. The rectus abdominis, however, which is especially affected in this disease, appeared to escape in poisoning by carbonic oxide. The microscopical appearances found in the muscles in these cases were merely those of granular degeneration. The muscular fibres of the heart presented similar alterations, but less constantly. The secreting tubes of the kidneys are also described as having undergone a slight granular change.

In his observations as to the symptoms produced by carbonic oxide Klebs depends mainly upon experiments on animals. The chief points in which he differs from Pokrowsky appear to be the following:—He did not see the tetanic spasms described by the latter observer, although he states that in dogs the limbs were sometimes rigidly extended shortly before coma set in. The respiration and the pulse were generally found to be at first quickened by this gas, at any rate when given in sufficient quantity; but when the voluntary movements ceased the frequency of the cardiac and respiratory movements sank again to the normal level.

The temperature was observed by Klebs to be from the first lowered by the inhalation of carbonic oxide, even when administered in quantity insufficient to cause insensibility. This fact, as I have above stated, had previously been noticed by Bernard and by Pokrowsky. In Klebs' experiments the lowering of temperature was very marked, amounting, for example, in a particular instance cited by him, to 63° Fahr.

It had been supposed by Traube that the distended state of the arteries, observed as an effect of the inhalation of carbonic oxide, is the result of an obstruction to the capillary circulation. It is remarked by Klebs, however, that this cannot be the case, for the manometer shows that the pressure in the arteries is diminished, and not increased, in animals poisoned by this gas. He therefore ascribes the dilatation of the vessels to a loss of tone in the muscular coat. In favour of this view, he urges the fact that the pupils are dilated, but that they are, nevertheless, made to contract by the Calabar bean. From this he argues that the fibres of the iris have lost their tone, but that they yet remain susceptible of the influence of stimuli. He also endeavours to prove that there is a similar relaxation of the fibres of the intestine and of the bladder.

A further confirmation of the opinion that an impairment in the tone of the walls of the vessels is a direct effect of the inhalation of carbonic oxide is drawn by Klebs from several experiments, in which he administered ergotin to animals poisoned by the gas. The ergotin is known to have the power of increasing the tone of the arteries, and it was found to have a tolerably marked effect in diminishing the symptoms produced by the carbonic oxide. The stupor, in particular, appeared to pass off

more rapidly than when no ergotin had been given. This drug is therefore suggested by Klebs as an antidote in cases of poisoning by carbonic oxide.

Klebs attaches the more importance to this matter because he attributes to the distension of the arteries a great part of the symptoms observed as a result of the inhalation of this gas. Thus, he ascribes the insensibility, not to the deprivation of oxygen (which was regarded as its cause by Pokrowsky), but to the distension of the cerebral vessels, leading to compression of the brain itself.

Prof. Hoppe-Seyler* has proposed to make use of the spectroscope as an aid in the detection of poisoning by this gas. Blood containing carbonic oxide gives, when examined with the solar spectrum, almost exactly the same absorption-bands as oxygenated blood; but sulphide of ammonium does not alter the bands when carbonic oxide is present, whereas when oxygen, and not carbonic oxide, is contained in the blood, the two bands are replaced by a single one midway between the lines D and E, within a few minutes after the addition of the sulphide of ammonium. In animals poisoned by carbonic oxide the presence of the gas can be recognised satisfactorily in this way. When exposed to the air, blood containing carbonic oxide gradually loses the gas. Hence, in medico-legal cases the examination of the blood by the spectroscope should be done as early as possible. However, if the temperature be not very high, several days may pass before the quantity of carbonic oxide in the blood perceptibly decreases.

The notes which follow refer to the chemical processes employed in testing for the presence of different poisons.

M. Roussin† publishes some observations on the use of magnesium in toxicological researches. This metal, not being a poison, and being itself a constituent of the animal body, does not, when employed by the chemist, involve the introduction of anything which can give rise to erroneous interpretations into a liquid suspected already to contain a mineral poison. Thus, M. Roussin recommends the use of magnesium instead of zinc in applying Marsh's test for arsenic or antimony. There is, indeed, a possibility of error in adopting this plan. If any silicon is contained in the magnesium (as was generally the case when the metal first became an article of commerce), siliciuretted hydrogen will be formed. Now, this gas decomposes at a dull red heat (like the gaseous compounds of arsenic and antimony with hydrogen), and forms a deposit of a dark brown colour. This deposit, however, is easily distinguished from one of arsenic or antimony. Either of these last disappears immediately when touched with a drop of nitric acid or of aqua regia. The arsenical ring is also instantly dissolved on the addition of a dilute solution of a hypochlorite. These liquids are without action on deposits of silicon. Moreover, a preliminary examination of the hydrogen given off by the magnesium and the acid should always be made before the addition of the liquid suspected to contain poison; and the presence of silicon would then, of course, be detected. The magnesium prepared

* 'Med. Centr. Bl.,' iv, 4; 'Grævell's Notizen, N. F., viii, p. 625.

† 'Jour. de Chim. et de Phar.,' 1866, 4^{ème} sér., iii, p. 413.

at the present time is, however, almost free from this impurity. M. Roussin states that the hydrogen which is given off by the action of sulphuric acid on magnesium seemed to him particularly pure. It burned with a nearly imperceptible flame.

The use of magnesium in this way has the further advantage that it leads to the detection of several other metals besides antimony or arsenic, supposing any of these other metals to be present. Thus, copper, lead, mercury, and zinc, are all thrown down by magnesium from acid solutions containing their salts. They either fall to the bottom of the liquid or remain attached to the surface of the plates of magnesium; and they either form flocculi or appear in a pulverulent or in a spongy condition. To ensure the complete separation of these metals, it is necessary to keep the liquid acid, and to add fresh pieces of magnesium until they retain their metallic appearance while being dissolved. The liquid should then be filtered, care being taken that there is a small piece of magnesium in excess when the liquid is thrown on the filter. Any of the above-named metals present will remain on the filter. The application of the usual tests will enable their nature to be determined. It is necessary to add that the mercury thrown down from solutions of corrosive sublimate is partly in the metallic state, partly in the form of calomel.

Dr. Cloetta,* Professor of Medical Jurisprudence at Zürich, has made some investigations with reference to the detection of strychnia. As to the delicacy of the different tests for this alkaloid, when pure solutions are employed, he has obtained the following results:—1. If 1 grain of pure strychnia be dissolved in 17000 ccm. of water, the bitter taste may be recognised in 1 ccm. placed upon the tongue. 2. The colour-test with sulphuric acid and bichromate of potass succeeds with $\frac{1}{7000}$ th of a grain, but not with any larger quantity. Even with $\frac{1}{7000}$ th of a grain the violet colour is very pale. The admixture of any other substance diminishes very greatly the delicacy of the test. 3. The crystalline precipitate with a solution of bichromate of potass may be distinctly obtained from 1 ccm. of a solution containing $\frac{1}{300}$ th of a grain of strychnia. The insolubility of the salt thus formed is shown by the fact that, after the addition of a sufficient quantity of the bichromate to a solution of strychnia, the supernatant liquid possesses scarcely any bitter taste.

Cloetta has also endeavoured to determine what is the smallest amount of strychnia which can be detected when added to an organic liquid, such as urine. His experiments showed that $\frac{1}{20}$ th of a grain can be certainly discovered in 650 ccm. of urine, but that $\frac{1}{40}$ th of a grain escapes detection.

Of his further observations, some were made on three patients, who were taking medicinally $\frac{1}{3}$ rd to $1\frac{1}{2}$ th grain of nitrate of strychnia daily. In no instance was even a trace of the alkaloid detected in the urine, although the whole quantity passed in 24 hours was used for analysis.

A horse was killed by a solution containing 20 grains of nitrate of

* 'Virchow's Archiv,' xxxv, p. 369.

strychnia. The first tetanic fit came on in half an hour, and proved fatal. None of the alkaloid was detected in 15 ounces of blood taken immediately after death from the large vein of the anterior wall of the stomach, nor was any found in 10 ounces of blood removed from the right heart, nor in 12 ounces of urine removed from the bladder. Another horse was killed by giving it 25 grains of the nitrate of strychnia. It died in the second tetanic fit, at the end of 25 minutes. An ounce of blood from the thoracic duct, a pound and a half of blood from the right heart, and the liquid obtained by digesting the liver in cold water, were severally examined, but yielded no trace of the poison. Cloetta does not profess to determine the cause of the disappearance of the strychnia, but promises some further observations on the subject.

Some of his experiments were made for the purpose of ascertaining how long strychnia can resist decomposition. Solutions, each containing a grain of nitrate of strychnia, were placed in 3 human stomachs, and the organs were then buried. The alkaloid was discovered in each case, although the stomachs were not exhumed for 3, 6, and 11½ months respectively.

Braun* has proposed, as a test for the presence of hydrocyanic acid, the reaction with picric acid first observed by Hlasivetz. When a strong hot solution of cyanide of potassium is added to a solution of picric acid (also concentrated and hot), the fluid acquires a deep blood-red colour. This is the result of the formation of a salt of potass, containing a new acid, which Hlasivetz termed isopurpuric acid. This reaction does not succeed with free hydrocyanic acid, so that it is necessary first to neutralize with potass the liquid to be tested. The picric acid should be dissolved in 250 parts of water. If the solution containing cyanide of potassium be very dilute, the quantity of picric acid added should be only just enough to give the liquid a citron-yellow colour. It should then be boiled. The colour does not appear at first, but only after some time, when the liquid has cooled, and particularly after it has been exposed to the air for some hours. This test is said to be more delicate than that which depends on the formation of Prussian blue, and to be equal to Liebig's process, consisting in the production of the sulpho-cyanide of iron.

During the last two years physiological tests (on which was based so large a part of the evidence in the La Pommerais trial, recorded in the 'Year-Book' for 1864) have been employed in two important medico-legal cases, and the medical literature of this period contains several papers upon the subject.

Dr. Hilton Fagge and Dr. Stevenson† have published a long series of experiments, made with the object of determining whether the application of physiological tests for digitaline leads to satisfactory results. They endeavoured to make their experiments under conditions as nearly as possible those which would be met with in actual practice.

* 'Prag. Vjhrsschrft.', xci, p. 94.

† 'Guy's Hosp. Rep.', 1866, p. 37.

They especially insist on the fact that, in the employment of physiological tests in cases of suspected poisoning, the effects observed in the animals experimented on should be compared with the known effects of poisons on that particular kind of animal, and not (as has been most generally the case) with the symptoms which had presented themselves in the person supposed to have been poisoned. In this way they avoid altogether the difficulty that the effects of poisons on man and on the lower animals are often different. Moreover, regarding the subject from this point of view removes the objections which have been urged against the use of frogs for experiment, instead of animals occupying a higher position in the animal scale. In the search for each poison that animal should be used on which the poison produces the most characteristic and constant effects. So far as digitaline is concerned, these observers are strongly of opinion that it is better to use frogs than either dogs or rabbits. The most important reasons for this opinion are the following:—Very small quantities of poison are sufficient to produce marked effects in frogs, so that a large number of experiments may be made with an amount of poison which would prove inert, if given in a single dose to a dog. Again, the action of digitaline on frogs is rapid. Within an hour, or an hour and a half, all the characteristic effects are produced. There is, therefore, no difficulty in watching the animal throughout the whole course of the experiment. Lastly, and chiefly, the action of poisons on different organs may be observed in batrachians much more perfectly than in the higher animals. In every one of the experiments of which I am speaking the heart of the frog was exposed before the poison was injected. The influence of the toxic agent upon the movements of the organ could, therefore, be watched from its first commencement.

The peculiar action of digitaline upon frogs appears to have been first observed accurately by Vulpian* in 1853. When this poison is injected beneath the skin of one of these animals, an interval elapses before any effects are observed. The following are the characteristic changes, which usually begin quite suddenly:—I. The rhythm of the heart's beats is not generally much altered, but they become peristaltic, or different parts of the muscular wall of the ventricle contract and dilate at different times, and the blood being driven from one part of its cavity to another causes the relaxed portions of the ventricle to form pouches or (as they are termed) *protrusions*. Another frequent effect is, that the ventricle only dilates once to every 2 or even to every 3 beats of the auricles. II. After these changes have been observed for a shorter or longer time the ventricle altogether ceases to dilate, remaining contracted, white, and perfectly empty. The time at which this occurs varies with the dose of digitaline and with the nature of the substances with which it is mixed. It is never less than 7 minutes. III. At this time the muscular power is unimpaired; the frog can leap as actively as before, and it retains the power of sensation. Paralysis, however, comes on in from 30 to 67 minutes, but this is not an effect of the digitaline, for it appears equally rapidly when the cir-

* 'Mém. de la Soc. de Biologie,' 1861, p. 97.

culuation is stopped in any other way, as, for instance, by ligature of the heart.

The first points determined by Drs. Fagge and Stevenson are, what dose of digitaline is necessary to produce these three characteristic effects, and whether they are invariably produced by this poison. It is shown that with doses of $\cdot 0078$ of a grain and upwards the action above described is observed with almost absolute certainty. Out of 26 experiments with pure solutions of digitaline, in doses as large as that just mentioned, there were only two in which the whole chain of effects failed to manifest itself. When the quantity of digitaline is smaller than that named its action is often limited to the production of peristalsis and irregularity of the ventricular beats, or, if the ventricle stops for a time, it afterwards resumes its action. It must be mentioned that, according to M. Vulpian, the effects of digitaline upon frogs which are healthy and have been recently caught differ from those above described. The observations of Drs. Fagge and Stevenson do not, however, confirm this statement.

The only substances which were known to produce in frogs the same effects as digitaline and preparations of digitalis are the *Helleborus viridis*, and, perhaps, the *Helleborus niger*, the *Tanghinia venenifera* of Madagascar, and certain arrow-poisons coming from different quarters of the globe, namely, Antiar from Java, Carroval and Vao from Rio Darien in South America, and Dajaksch from Borneo. To these Drs. Fagge and Stevenson add the *Scilla maritima*, which they find to cause effects in the frog undistinguishable from those of digitaline. They also mention Manganja, an arrow-poison from the Zambesi, of which the action was first observed by Dr. Sharpey. M. Pelikan,* one of the discoverers of the action of the Tanghinia and of that of the *Helleborus viridis*, has recently described the "Inée" or "Onage," an arrow-poison from the Gaboon River of Western Africa, as producing identical effects. Both it and the Manganja are the seeds of Apocynaceous plants. The name of *cardiac poisons*, proposed by Claude Bernard for certain of the substances above mentioned, is extended by these observers to the whole group. No other agent with which they experimented resembled digitaline in its effects on the frog. They tried 19 different medicinal substances, including most of the emetics, purgatives, and sedatives; the only two among these agents of which the effects in any degree resembled those of digitaline were emetina and the extract of the *Delphinium staphysagria*, and in these instances the resemblance was but partial. It is remarkable, however, that the cardiac poisons are not only widely distributed in nature, but are also derived from plants having no botanical affinities, and this is, perhaps, a reason for expecting that the list of substances producing similar effects will hereafter be increased.

Having determined the constancy of the action of pure solutions of digitaline on the frog, Drs. Fagge and Stevenson proceeded to add the poison to matters vomited by patients or removed from the human stomach after death, and to apply physiological tests to extracts after-

* 'Comp. Rend.,' 1865, 60, p. 1209.

wards made from these matters. Their experiments, 31 in number, showed that the effects of digitaline may be readily obtained from such extracts. In several instances dialysis was employed before extracting the liquids; but this process was afterwards given up, for it was found that the extract of what remained in the dialyser gave results as satisfactory as the extract of the diffusate.

To make it certain that the effects observed in these experiments were really caused by the digitaline, a series of comparative observations were made with extracts of vomited matters or gastric contents to which no digitaline had been added. This led to the discovery that such extracts are themselves poisonous to frogs. Fourteen such extracts were employed, and 29 experiments were made with them. In all but 2 instances toxic effects were observed, consisting, for the most part, in impairment of the frog's muscular power, and also of the action of its heart. When the heart was affected its beats became feeble, and not infrequently ceased altogether, the organ then remaining distended, and being of a dark purple colour. In some cases there was a partial resemblance between the effects of such extracts and those of digitaline, but in no one instance was that conjunction of symptoms observed which is described by Drs. Fagge and Stevenson as the almost invariable result of the action of a sufficient quantity of digitaline. The cause of the poisonous action of these extracts on frogs could not be determined. A few experiments on a dog, a rabbit, and some mice, left it doubtful whether such extracts are capable of producing toxic effects on the higher animals.

Lastly, these observers proceeded to inquire whether the matters vomited by dogs poisoned with digitaline, and those removed from the stomachs of animals killed by this substance, would yield extracts from which the characteristic effects on frogs could be obtained. Three dogs were, therefore, killed by digitaline. In each instance the results were perfectly conclusive. In one case it was found that the poisonous action of the extract itself interfered with that of the digitaline; but by adding a considerable quantity of water, and filtering, this extract was obtained in a form which yielded effects entirely satisfactory. The same result was obtained in other cases by roughly separating the solid from the liquid parts of the gastric contents or vomited matters before extracting with alcohol.

With reference to the La Pommerais trial, it is remarked that the experiments on *frogs* made by MM. Tardieu and Roussin appear to afford strong evidence of the presence of digitaline, although the account of these experiments is somewhat meager. There is, however, a great difficulty in admitting that there could have been a quantity of digitaline in the matters vomited by Mme. de Pauw sufficient to cause the poisonous effects observed in the *dogs* used by the French experts.

M. Pelikan,* who has been mentioned above as the discoverer of the effects of the helleborus and other "cardiac poisons," has subjected the La Pommerais case to a critical analysis. His conclusions, which coincide pretty closely with those expressed by Drs. Fagge and Steven-

* 'St. Petersburger Med. Ztschrft.,' vii; 'Canstatt's Jahresbericht,' vii, 7, p. 39.

son, are as follows:—1. There is no doubt that Mme. de Pauw died of poisoning by one of those substances which act specifically upon the heart. Of this he is convinced, not so much by the circumstances of the case, as by the experiments on frogs. These do, indeed, present some deficiencies for which the experts are responsible, but their results are, in his opinion, so striking that they have the same value as the demonstration of a *corpus delicti* in an ordinary case of poisoning. 2. It is probable that Mme. de Pauw was poisoned by digitaline. The probability, however, rests merely on the facts of the case, as determined by the medico-legal investigation. It does not in any way depend upon the results of the physiological experiments; for neither did the experts attempt to determine any peculiarities in the action of digitalis, distinguishing it from that of the other cardiac poisons, nor, indeed, is science as yet acquainted with any such peculiarities.

M. Devergie has published* a paper on the subject of the use of physiological experiments in medico-legal inquiries. He is now inclined to admit their application, within certain limits. The recognition of their value by M. Devergie is of the more importance, since he, like Orfila, had previously expressed a very strong opinion on the opposite side of the question.

M. Devergie seems to have been led to reconsider the matter in consequence of the fact that he was consulted, on the part of the accused, in a medico-legal inquiry in which physiological experiments had been employed by MM. Tardieu and Roussin. A French *officier de santé* was accused of the murder of his wife by poison. The woman's body was exhumed more than 3 months after her interment.

As might be expected, the examination of the organs did not show conclusively whether there was or was not disease sufficient to cause death.

The results of the chemical analysis were the following:—There was obtained from the intestinal canal a quantity estimated as being about 25 centigrammes (3·86 grains) of acetate of morphia. There was also obtained a quantity said to be about 35 or 40 centigrammes (5·4 to 6·17 grains) of a "greenish yellow substance, lustrous, scaly, having a very feeble odour and an intensely bitter taste, neutral to test-paper, soluble in water and in alcohol, less so in ether, attracting the moisture of the air, burning after the manner of nitrogenous substances, giving off no animal odour, and leaving no residue beyond an imponderable quantity of calcareous salts." This "new substance" (or rather, as M. Devergie urges, "impure body of unknown origin") was made the subject of physiological tests by MM. Tardieu and Roussin. It was injected beneath the skin of two dogs. One of them died in 25 hours; the other became ill, but ultimately recovered. The symptoms were said to resemble those due to digitaline, and also those observed in Mme. Z— during life. Some of the same substance was injected beneath the skin of two frogs. They died in 9 minutes. Afterwards 3 frogs were taken, and the heart of each was exposed. The first frog was employed as a standard; the second received a solution of digi-

* 'Annales d'Hygiène,' 2ème sér., xxvi, p. 168.

taline; the third, a solution of the substance extracted from the intestines of Mme. Z—. In the first frog there was a diminution of the heart's beats by only 5 or 6 beats. In the second they fell from 52 to 4 in 13 minutes. In the third they fell from 58 to 36 in 8 minutes, and to 4 in 28 minutes. MM. Tardieu and Roussin, however, state that "it is not without interest to compare the effects of this substance . . . with *veratrine* as well as with *digitaline*."

The discovery of morphia (even in quantity "sufficient to kill") was accounted for by the fact that 60 centigrammes of acetate of morphia (9 grains!) had been given to Madame Z— medicinally in two doses, at twelve hours' interval. She had previously been taking opium, but only in doses of 5 to 15 centigrammes ($\frac{3}{4}$ of a grain to 2 grains). The sudden exhibition of this enormous quantity of morphia is stated to have merely relieved her pain. It is not considered either by MM. Tardieu and Roussin or by M. Devergie to have had anything to do with her death. M. Devergie, however, criticises very severely the conclusions of MM. Tardieu and Roussin with reference to the case. It is much to be regretted that the original report of these experts has not been published.

The other medico-legal case in which physiological evidence was employed was the trial of Dr. Pritchard for murder.* In this instance the suspected fluid was contained in a bottle, labelled "Battley's Sedative Solution," found in the pocket of Mrs. Taylor, who was the mother-in-law of Dr. Pritchard, and was supposed to have been poisoned by him. Antimony in a soluble form was detected in this fluid, in the proportion of one and a half grain of tartarized antimony to the fluid ounce. Its extract, when applied to the tongue, gave rise to a peculiar benumbing and tingling sensation, increasing in intensity for a short time, and persisting for several hours. In this it differed altogether from the extract of pure Battley's Solution, and resembled perfectly an extract of Fleming's Aconite, and consequently the presence of this poison was suspected. By Stas' process, and other chemical means, more distinct indications of aconite were obtained; but it was soon determined to rely on physiological evidence rather than to waste the remaining material in chemical tests, which would necessarily be inconclusive.

The animals used in these experiments were rabbits. The substances employed were four in number—1, genuine Battley's Solution; 2, tincture of aconite (Fleming); 3, mixtures of tincture of aconite with genuine Battley in various proportions; 4, "Pritchard's Battley" (supposed to contain the poison). From these various liquids extracts were made, by evaporation at a gentle heat or in vacuo. The extracts were then suspended in pure water, and were administered to the animals, generally by injecting them beneath the skin. In some cases they were introduced into the stomach or dropped into the eye, but it was found that these methods were much less convenient than that of subcutaneous injection, and yielded much more variable results.

* 'On the Detection of Aconite by its Physiological Action,' by Prof. Penny and Dr. Adams; Glasgow, 1865. (Pamphlet.)

Nine experiments in all were made with the genuine "Battley;" of these, five were by the method of injection beneath the skin, the quantities used being from ten to fifty grains of the extract.

The effects are described in the following words:

"Within ten minutes of the introduction of the poison by injection under the skin the animal seeks a prone position, lying fully extended on belly and chest, the head resting on the ground, the legs sprawling, the claws concealed. If undisturbed, it inclines to retain this position, rarely shifting its place or attitude. When urged to motion it crawls a few paces in a tortoise-like manner, but speedily subsides into its former passive, motionless condition. When lifted by the ears it struggles, and when laid on side it recovers its legs. A sharp noise or heavy footfall attracts its notice. The eyes remain open, and only tend to close at occasional long intervals. The pupils are dilated. The respiration is slow and gentle. In from five to eight hours the effects begin to pass away, and in about fourteen hours the animal eats freely and exhibits vivacity in its movements."

Particular attention is drawn to the fact that no convulsions were produced by opium in rabbits, either in these experiments or in others in which an alcoholic extract of the drug was employed.

With the extract prepared from tincture of aconite eight experiments were made. In two instances subcutaneous injection was employed. The following is the description of the effects observed:

"The symptoms vary in the order and in the rapidity of their production according to the strength of the dose. In a case proving fatal, and where there has been time for the development of the effects, there is first an interval of restless uneasiness, during which the animal shifts its position, and occasionally couches, with one or both hind legs extended laterally. It remains for a short interval in an attitude of expectancy or watchfulness, during which a twitching of the lips and a chewing action of the jaws is observed. Gradually the limbs become awkwardly stiff, the claws protruded, and the feet sprawling, as if grasping the floor, the animal seemingly steadying itself. The head is carried erect and somewhat retracted, the nostrils expanded. Occasional spasmodic movements of the ribs and belly occur as if retching. Suddenly the animal staggers and rolls over, quickly regaining its feet. Saliva begins to flow from the mouth, and, soon after, peculiar chirping or stridulous cries are emitted. The severe convulsions which quickly and invariably follow are of an opisthotonic character, the limbs being extended in a straight line with the body, the back arched, and the head excessively drawn back. In a few seconds the convulsions subside, and the limbs become relaxed, the animal lying helplessly on its side. After a longer or shorter interval it is then occasionally affected with an impulse to rush madly forward or make violent leaps, without regard to obstacles; but the motions are of an abortive paralytic character, the legs sprawling about in a floundering, jerking sort of action, altogether different from the usual leaping motion of the animal. After one or more convulsive seizures it lies on its side with head retracted, nostrils distended, flanks heaving, the forepaws spread apart and held in the air. The respiration becomes very evidently laborious, is quite audible, and

seems altogether diaphragmatic or abdominal. In this utterly helpless condition it is still sensible to stimuli; it winces when the cornea is touched, and is roused to momentary effort on pulling or squeezing the ears, legs, or tail. Salivation continues, but no longer accompanied by the twitching, chewing movements; the eyelids are half closed or drooping; the pupil usually contracted. In this prostrate state an interval of many minutes, or even of some hours, may elapse, during which occasional convulsive seizures may occur. Frequently, at the termination of such seizure, the urine is forcibly discharged. At length a strong convulsion takes place, and the animal dies. The limbs immediately relax, and the pupil begins to dilate. Rigor mortis is nearly complete in from forty to sixty minutes."

Having thus ascertained the action of opium and aconite separately, Prof. Penny and Dr. Adams proceeded to determine, by thirteen experiments, the nature of their effects when mixed in varying proportions. The symptoms observed were evidently due to a blending of the effects of the two substances. When the amount of extract of Battley was less than eighteen times that of the extract of aconite the action of the latter predominated. There was, however, less of the active uneasiness noticed with the aconite alone, a stronger disposition to rest being manifested. The head was invariably carried erect. When the animal was made to move the hobbling or crawling progression was observed, rather than the spasmodic jerking action caused by aconite. The convulsive seizures were not less in severity, but the intervals of relaxation were longer.

With the extract of "Pritchard's Battley" five experiments were made. The effects observed resembled those produced by Battley's Solution mixed with aconite, so closely that no possible distinction could be drawn between them.

Prof. Penny and Dr. Adams therefore concluded—

1. That "Pritchard's Battley" contained a poisonous substance.
2. That this substance was aconite.

They inferred from their experiments that the proportion of tincture of aconite in "Pritchard's Battley" was from 5 to 10 per cent.

It is interesting to find that these writers especially insist on the fact that they did not attempt to draw any analogy between the action of the poisonous agent on animals and that observed in the cases of Mrs. Taylor and Mrs. Pritchard. "It appeared to us," they say, "of little moment that the phenomena manifested in our trials with the rabbit should differ from those exhibited by the human subject when under the influence of the same agent. For our purpose it was sufficient if the toxic action was uniform and characteristic when employed on the same animal."

Dr. Pritchard ultimately confessed that he had put aconite into the Battley's Solution.

Dr. Senator* describes the post-mortem appearances found after death by chloroform, basing his observations on an analysis of 46 rapidly

* 'Vierteljahrsschrift f. ger. Med,' N. F., Band ii, p. 310.

fatal cases. The presence or absence of rigor mortis was noticed in 22 of these cases, and in 10 of them the rigidity of the muscles is said to have been unusually great. It was also much prolonged, having been present even seventy or seventy-two hours after death; and in a case in which the chloroform was swallowed it existed at the end of a week. In every instance, when observed at all, the blood was found fluid and of dark colour. In 11 cases the blood was noticed to be frothy and to contain bubbles of gas. Dr. Senator discusses the question whether these bubbles consist of the vapour of chloroform. He shows that they are observed especially when life has been prolonged, and that in cases in which the blood has been observed to smell of chloroform there is no mention of their presence. He therefore concludes, with Casper, that this appearance is due to an unusually early decomposition of the blood. In one instance these bubbles were found in the blood within fourteen hours after death, although it was winter. Of 41 cases in which the state of the heart was noticed, it was relaxed and nearly or quite empty in 33 or 34; and only twice or three times were all its cavities distended. In 5 cases the right side alone contained blood in greater or less quantity. The heart was sometimes found to be "quite pale," "as if washed out" and "flattened," this relaxed state being accompanied by an extreme rigor mortis of the voluntary muscles. Senator supposes that the rigor of the heart takes place unusually early after poisoning by chloroform. An odour resembling that of chloroform was observed only four times in these 46 cases; three times after twenty-four hours had elapsed, once after thirty-two hours. It has often been absent when the autopsy was made much earlier. The smell has generally been most distinctly perceived on opening the cranial cavity.

In conclusion, Dr. Senator remarks that the question whether a case of death by chloroform was one of suicide or murder might sometimes be answered by finding the sponge, or handkerchief, used in the inhalation of the vapour, firmly clenched in the dead man's hand. This has several times been observed, and, of course, it shows conclusively that the chloroform has been taken for the purpose of suicide, for it could not be imitated after death.

The trial of Mr. Sprague on the charge of administering poison to his wife, father-in-law, mother-in-law, and servant, at Ashburton, gave rise to a discussion* which is undoubtedly of interest, although it cannot be said to have led to any certain conclusions. The whole party were taken ill after eating a rabbit-pie. The symptoms were those of poisoning by belladonna or atropia; a rash resembling urticaria, dilatation of the pupils, vomiting, incoherency of speech, and inability to walk. Atropia was proved to be in the possession of the accused, and Mr. Herapath, sen., of Bristol, deposed that, from the experiments he had made, "he was convinced that atropine had been introduced into the interior of the pie." As it was proved that the prisoner was away before the time when the pie was made, a verdict of *Not Guilty*

* 'Pharm. Journ.,' 2nd series, vii, p. 127; 'Times' newspaper.

was returned. The way in which the pie had been poisoned was therefore left undecided.

Dr. W. Ogle afterwards suggested that the presence of atropia in the rabbit-pie might have arisen from the fact that the rabbit had fed on the leaves of the deadly nightshade. He quoted the experiments of Runge of Berlin, who fed a rabbit for eight days exclusively on the leaves of belladonna, hyoscyamus, and datura; at the end of this time the rabbit remained quite well, its pupils being not in the least dilated. In reply to Dr. Ogle, Dr. McGill endeavoured to show that the flesh of rabbits who had eaten belladonna leaves without injury to themselves would not be noxious to man. He remarked that, although goats feed on hemlock, their flesh has not been found to be poisonous. Dr. Ogle, however, rejoined that conia, being volatile, would be driven off during the process of cooking; in illustration of this, he quoted a case recorded in the 'Lancet' of 1843, in which a number of persons were poisoned by eating hemlock in a salad, although the cook had a few days before used a number of leaves from the same plant in making soup, without any ill consequences.

The question as to the mutual antagonism of opium and belladonna, in their physiological action, continues to be the subject of discussion in the medical journals. Most of the papers, however, which I have met with consist either of reports of individual cases, never very conclusive, or of experiments on animals. I therefore prefer to quote from a very interesting essay by Dr. Weir Mitchell, Dr. Keen, and Dr. Morehouse,* containing an account of some experiments made by them upon the human subject. By subcutaneous injection they administered to soldiers affected with neuralgia solutions of morphia and of atropia, sometimes together, sometimes in succession, without telling the patients what effects they expected to be produced. In this way they investigated the action of the alkaloids in question on the various functions of the body. The following are their conclusions with reference to the mutual antagonism of morphia and atropia. As to the influence of these poisons on the circulation, they state that morphia (in a dose of $\frac{1}{4}$ to $\frac{1}{2}$ of a grain of the sulphate) affects the pulse slightly or not at all; atropia, on the other hand (in a dose of $\frac{1}{15}$ to $\frac{1}{30}$ of a grain), usually lowers it a few beats within ten minutes, and then raises it 20 to 50 beats within an hour. The pulse afterwards falls about the tenth hour below the normal number, and regains its healthy rate within twenty-four hours. The frequency of the respiration, however, is not altered either by morphia or by atropia. Morphia has no power to prevent atropia from thus influencing the pulse, so that, as regards the circulation, they do not counteract one another. On the other hand, the action of these alkaloids on the pupils is antagonistic. When the pupils had been dilated by atropia they began to contract within half an hour after the injection of morphia. The influence of this alkaloid, however, passed off before that of the atropia, so that in from five to ten hours the pupils again became dilated. As a general rule, about $\frac{1}{4}$ of a grain of morphia was found to neutralize for a time $\frac{1}{30}$ of a grain of atropia; but

* 'Am. Journ.,' N. S., 50, p. 67, July, 1865.

the action of the latter alkaloid was longer continued. The cerebral effects of these alkaloids also are antagonistic. The headache and phantasms of atropia are certainly controlled by morphia, and so are also the partial deafness and the visual defects which the former drug occasions. Conversely, when morphia has been fully used, the drowsiness and stupor, which are the best tests of its power, disappear under the influence of atropia. On the other hand, the dryness of the mouth caused by atropia is not made less by the coincident or previous use of morphia. Atropia does not constipate, and may even relax the bowels; morphia has an opposite tendency. The nausea caused by morphia is neither prevented nor removed by atropia. In their action on the urinary organs there is a great similarity between these two alkaloids. In a dose of $\frac{1}{15}$ to $\frac{1}{30}$ of a grain atropia produces dysuria, resembling that often observed after the administration of morphia. The power of removing pain which is possessed by morphia (and in which these observers find atropia to be altogether wanting) is in no degree lessened by the administration of the two alkaloids together. It is therefore suggested that, by injecting morphia and atropia simultaneously, it would be possible to obtain the anodyne effects of the former agent, without the disagreeable cerebral symptoms which it often causes when used by itself. It appears from the investigations to which I have been referring that the alkaloids in question are mutually antidotal, so far as their toxic effects on the cerebral organs are concerned, but that this antagonism does not extend throughout the whole range of their action.

Blood-stains.

M. Roussin discusses* some of the chief methods of determining the nature of spots supposed to consist of blood. After asserting that the various chemical reactions which have been proposed are valueless, he disposes summarily of the process which depends on the formation of blood-crystals. Their composition is, he says, problematical; their form is neither definite nor constant, and their production is the result of chance and of an accidentally successful evaporation, rather than a constant occurrence. This test, therefore, is neither rigorous nor constant, and thus is deficient in the most essential characters of a scientific procedure.

M. Roussin attaches very great importance to the determination of the exact diameter of blood-corpuscles by the microscope. It is true that this is liable to be affected by endosmosis, and therefore the biconcave form and the exact diameter of $\frac{1}{120}$ of a millimètre are found only when the discs have undergone no change. For the preservation of fresh blood he recommends a mixture containing 3 parts by weight of ordinary glycerine, 1 part of concentrated sulphuric acid, and sufficient distilled water to give a specific gravity of 1.028. The sulphuric acid and glycerine prevent the evaporation of the water, so that the liquid remains of nearly constant density. The best method of examining a suspected stain is to cut out a little piece of the texture on which it is

* 'Ann. d'Hyg.,' 2ème série, xxiii, p. 108.

found, and to place it on a glass slide, adding a few drops of the liquid. At the end of three hours the fragment of tissue may be removed, and the liquid is then to be examined with a microscope, when any blood-corpuscles that may be present will be detected. The exact diameter of those which are least altered in form is to be determined; and the mean of these determinations, if it approaches the normal diameter of fresh human blood-corpuscles, will decide the medico-legal question. Roussin admits, however, that endosmosis and exosmosis cannot always be completely avoided, so that the exact diameter of the corpuscles may differ slightly from that of recent blood-discs. Moreover, the corpuscles are never so well-defined as those which have undergone no change. With reference to the distinctions between human blood and that of the lower animals, M. Roussin thinks that when the mean diameter of the corpuscles is considerably smaller than that of the human blood-discs, and when the corpuscles themselves present no alteration in form, it may be asserted that the stain does not appear to consist of human blood. But even though the mean diameter of the discs should be exactly $\frac{1}{125}$ of a millimètre, *the expert should nevertheless hesitate, and should not affirm that the blood is human.*

In conclusion, M. Roussin gives two cases which have come under his own observation. One is that of a man accused of murder, on whose blouse some blood-stains were found, of which he could give no satisfactory account. The microscope, however, showed that the discs in these stains were oval in form; and as some fish-scales were found adhering to one of the spots, it was concluded that the blood itself was that of a fish. The other case was one in which a woman, who was accused of mutilating a man, asserted that some blood-stains on her petticoat came from a fowl. The discs in these stains were found to be circular in shape, and therefore MM. Tardieu and Roussin, who examined them, deposed that the blood certainly was not that of a bird, although they could not swear that it was human.

The application of spectrum-analysis to the detection of blood has already been alluded to in the 'Year-Book' for 1864.* This method of investigating the nature of stains supposed to consist of blood has, however, since undergone great improvement. In the first place, Prof. Stokes† has shown that the optical properties of solutions containing blood are greatly modified by the addition of oxidizing or deoxidizing agents. The substance which gives the dark lines described by Hoppe is easily decomposed by hot water, alcohol, or weak acids, and his method would therefore often be inapplicable. This substance—the natural colouring matter of blood—is not the same as the hæmatin of Lecanu, and gives dark lines differing from those yielded by the latter. As it has hitherto received no distinctive name, Prof. Stokes proposes to call it *cruorine*. Cruorine, like hæmatin itself, may exist in two states of oxidation, distinguishable by a difference of colour and a fundamental difference in their action on the spectrum. To these varieties he gives the names of *scarlet* and *purple cruorine* respectively. It is not possible, in the limited space at my disposal, to give details as to the differential

* Page 445.

† 'Proc. of the Roy. Soc.,' xiii, p. 355.

characters of these various bodies, and the chemical methods by which one may be obtained from another of them. Prof. Stokes recommends that in forensic inquiries the method of spectrum-analysis should be so applied as to yield the absorption-bands of "red or reduced hæmatin" in an alkaline solution. In sharpness, distinctive character, and sensibility, these bands rival those of scarlet cruorine itself. The bands of "brown hæmatin" dissolved in a mixture of ether and acetic acid are hardly less characteristic, but for their production a larger quantity of the substance is required.

The value of these facts, however, so far as their application in medico-legal practice is concerned, depends in a very great measure on the adaptation of the apparatus for spectrum-analysis to the microscope. This was first done by Mr. Sorby.* The arrangement originally proposed by him has since been very greatly improved by introducing the prism into the eye-piece of the microscope. In the apparatus as now constructed two spectra can be seen at the same time, one of the objects being placed on the stage of the microscope, the other on the stage of the spectroscope. The exact position of absorption-bands in the spectrum of an unknown substance can thus be accurately determined by comparing them with those of some known liquid.

The brown colour acquired by blood when dried by exposure to the air has been shown by Mr. Sorby to depend on the presence of acid matter in the atmosphere, turning the scarlet cruorine into a brown variety. This change is associated with an alteration in the spectrum; the bands in the green become less and less deep, and a band in the red is gradually formed. The time required for this to occur varies with the locality; in the centre of Sheffield it took only a few hours, while in the country, far from any houses, it was only after a week had elapsed that an appreciable change was observed. In his own house Mr. Sorby found that the rapidity of the alteration in the cruorine was greatly affected by the combustion of gas.

A *résumé* of the whole subject of spectrum-analysis, and particularly of its medico-legal applications, is given by Dr. Letheby.† The following is the method of examining blood-stains advised by this writer:—A portion of the stain should, if possible, be detached from the fabric or tissue on which it rests, and dissolved in a single drop of water in a watch-glass. The liquid should then be transferred to a small cell made of barometer-tubing, which may be one eighth of an inch in bore and half an inch long. The tube should be covered with a piece of thin microscopic glass, and should be left in a horizontal position for a quarter of an hour, until the suspended insoluble matter has subsided. It is then to be placed on the stage of the microscope, and examined with a half-inch or quarter-inch objective, care being taken that the top of the liquid is brought into focus. When this is done the prism of the spectroscope is to be put on, and the slit is to be narrowed until the bands become distinct. The exact appearance of the spectrum will vary according to the extent to which the cruorine has undergone the change into the brown variety described by Mr. Sorby. Now, if a little am-

* 'Quar. Journ. of Science,' April, 1865, p. 211.

† 'London Hosp. Rep.,' iii, 1866, p. 6.

monia be added to the solution, the band in the red (supposing this variety to be present) will disappear, and those in the green will become strengthened. A minute fragment of citric acid may next be placed within the tube, the liquid being stirred up by means of a platinum wire. This will weaken the dark bands in the green, or even make them disappear altogether, if the citric acid is in excess. In that case a little more ammonia must be added, and afterwards a very small particle of a crystal of protosulphate of iron. The cell is then to be immediately covered with a piece of thin glass, and secured with gold-size, so as to exclude the air. Turning the cell over and over for a few minutes is sufficient to enable the protosulphate of iron to dissolve and deoxidize the cruorine, changing it into the purple variety, which then gives the characteristic spectrum, with a single band on the green. The specimen may be preserved in this condition for many months.

If the blood be very old the cruorine will have become altered into hæmatin, so that it will not dissolve in water. It must then be treated with a drop of water acidulated with citric acid. This leads to the conversion of the cruorine into hæmatin, even if it have not already undergone this alteration. The spectrum then exhibits a band in the red, and another in the green; and if daylight is used for the examination, there is also one in the blue. On adding a little ammonia, so as to make the liquid distinctly alkaline, and then a small crystal of the protosulphate of iron, the hæmatin will be reduced, and will give a spectrum with two bands in the green.

Dr. Letheby states that there are no real fallacies in the application of these tests, for although many red solutions may produce on clothing stains like those of blood, and may even give spectra of which the appearance is at first sight like that of one or other of the blood-spectra, yet there are no such liquids which present all the characters of blood when treated with different reagents. Few, if any, will stand the test of ammonia, which only brightens the absorption-bands of blood, while it alters the appearance of other colours; and if there be doubt, sulphite of potass will remove it, for this bleaches every colour which is likely to be mistaken for that of blood. Among the reds which cut off the blue end of the spectrum, and exhibit black bands in the green, more or less like those of blood, are cochineal, lac-dye, alkanet, madder-red, and munjeet, dissolved in each case in a solution of alum; but on examining the spectra of these liquids side by side with those of blood, it will at once be seen that the bands are not the same, either in position or character. The chief precautions necessary to be observed are the following:—1. The solution should not be too strong, nor, on the other hand, too weak. 2. The reagents (especially the citric acid and the protosulphate of iron) should be added in very minute quantity. 3. The object should be a little out of focus, or the spectrum will contain lines not due to the colouring matter. 4. The width of the slit should be adjusted during the examination, so as to give the best effect. Dr. Letheby states that, in his opinion, the results are most satisfactory when an artificial light is used, such as that of a paraffin lamp or of gas.

Dr. Bird Herapath has been the first to employ the micro-spectroscope

in a medico-legal inquiry.* The case was that of Robert Coe, who was tried for the murder of John Davies, at Aberdare. The stains were found on the handle of a hatchet, beneath the iron ring. Blood-globules were obtained from these stains, and a solution examined by the micro-spectroscope yielded the two dark absorption-bands.

Hanging.

M. Tardieu relates † a case in which a woman was found dead, having been hanged either during life or after death, and in which there was great difficulty in determining the question between suicide and murder. The woman, aged 48, was found lying dead in an outhouse at half-past 8 a.m. Those who were first on the spot, being called by the cries of her husband, saw the body seated, as if it had fallen against a pile of wood beneath a beam to which a rope was attached. This rope was found broken when the body was discovered; but it was clear that it had been used in the following manner:—It was doubled, and it had its free ends tied round the beam in a knot formed by a single bow (so that pulling on these ends would at once have unfastened the rope); the loop thus produced (which would have hung downwards) had been made into a noose by means of a knot. The rope gave way at the spot where the loop pulled upon the vertical part of the rope. Hence, when the body was discovered the rope was found fastened to the beam by a single bow (as above described), and terminated below in two free ends, which corresponded to one another, the two portions being kept together by a knot a little above this point. The position of the body was compatible with the supposition that it lay where it had fallen when the rope gave way. The corpse was only partially clothed. It is said that, even when first discovered, it was cold and stiff. It is, at any rate, certain that Dr. Abadie (the first medical man to arrive) found the face and trunk cold, and the body markedly rigid. There were evident signs of constriction round the neck; these consisted in a circular mark, single or (according to some) made up of two marks placed close together, less defined on the left side of the neck, and bending upwards slightly on this side. Immediately below this spot, where the constriction was less distinct than elsewhere, were eight small ecchymoses, looking like bruises, arranged regularly in two horizontal rows of four each, those in the upper row being oval, those in the lower row nearly circular in form. The lobule of the left ear also presented an ecchymosis. The constriction on the neck was of a brownish colour, and the skin, as well as the cellular tissue beneath, was commencing to dry up into a parchment-like substance.

There was no doubt that the mark round the woman's neck was caused by the rope found on the beam. The beam itself was indented by the rope, showing that the weight suspended by it must have been considerable. It was, indeed, objected that the line of constriction on the woman's neck ought to have been wider at some one spot than elsewhere, corresponding to the position of the knot in the rope; but M.

* 'Pharm. Journ.,' vii, p. 530.

† 'Ann. d'Hyg.,' 2ème série, xxiii, p. 340.

Tardieu showed that this knot would not really have pressed on a wider surface than the rest of the rope, and that it very likely came just at the part of the neck where the pressure was least, as evidenced by the indistinctness of the mark.

The important question to determine was, whether the woman had hanged herself, or whether she had been first strangled and then hanged post-mortem by her murderer, for the purpose of averting suspicion. The fact that the rope was tied round the beam only in a single bow was undoubtedly in favour of suicide, for a murderer would probably have fastened it much more securely. The chief difficulty in the way of the hypothesis of suicide was the presence of the eight ecchymoses on the left side of the neck. Many theories were suggested to account for these marks; they were attributed (1) to the pressure of the knot mentioned above, the position of this being supposed to have been altered several times by the movements of the head; (2) to the doubling of the cord, which thus would have produced both the line of constriction and the ecchymoses; (3) to the skin having fallen into folds, so that the intervals between these folds were protected from pressure; (4) to some accidental circumstance, which could not be completely explained.

M. Tardieu has no difficulty in showing that no one of these hypotheses is admissible. He considers that the ecchymoses in question were produced by the left hand of the woman herself, in an instinctive effort to loosen the rope from her neck, the upper ones being caused by the pressure of the phalanges themselves, the lower ones by that of a row of articulations. All those persons who first saw the body coincided in thinking that the eight little bruises resulted from the pressure of a human hand. They were found to correspond exactly with the projections on the back of the fist, and it is even remarked that the hand which produced them must have been a small one. In support of his opinion, M. Tardieu quotes the case of a young man who hanged himself in the prison of Mazas, and who was observed to have tried during the agony of death to pull away the rope from his neck with his right hand.

As for the ecchymosis on the ear, M. Tardieu attributes it either to the pressure of the extended fifth finger or to the friction of the vertical part of the rope. He further insists on the fact that the post-mortem appearances generally were those of hanging rather than of strangulation. The points on which he relies in support of this statement are, that the face was pale; that there was no white or bloody foam in the larynx or trachea; that the lungs presented merely an engorgement of their lower lobes; that there were no subpleural ecchymoses; and that none of the superficial air-vesicles were ruptured.

There was a further difficulty as to the time at which death had occurred. The husband of the woman stated that he had talked with her a little after 5 o'clock in the morning. The question was, whether, if this were true, the body could have been cold when first found, as was stated to have been the case. With reference to this point, M. Tardieu thinks that the face and the exposed parts might have become cold even then, and that it is quite possible that, within 6 hours of her death,

rigidity might have set in, and cadaveric lividity of the depending parts have made its appearance, as stated by M. Abadie.

M. Tardieu gave a positive opinion that the death of the woman was caused by hanging alone, and that it was suicidal.

Dr. Heinrich* relates a case of death by hanging, in which there are some features of interest. A woman started off from her home, saying that she was going to a place a mile and a half distant, to buy flour. She took with her a sack and a rope. On the evening of the same day she was found hanged to a tree, in a small wood a few feet from the road. One end of the rope was fastened round a horizontal branch, which was six feet six inches from the ground, but which could be reached without difficulty. The other end of the rope formed a noose round the woman's neck. Her feet were not in contact with the ground. Her mouth was filled with a mass of dead leaves. On her right shoulder was fastened a piece of paper, on which the following words were written with a lead pencil:—"We three have committed this murder. We found on her one thaler, fifteen silbergroschen. She merely prayed for her two children."

There were no indications of injury on her body, the clothes were undisturbed, and there was nothing to show that she had offered any resistance. No signs of any struggle were to be found. It was therefore considered that the case was one of suicide; and this view was confirmed by the fact that the language of the paper pinned on her shoulder was such as could have no object except to excite sympathy and compassion for the woman's fate. It was, therefore, very unlikely that it had been written by her murderers. It was subsequently ascertained that the handwriting was like that of the woman, and that a charge of fraud had probably been her motive for killing herself.

Pregnancy.

The following case is related by Dr. Fischer.† A woman, æt. 29, who had already had two illegitimate children, was obliged to leave her situation because she was again pregnant. She went to the poor-house, where her condition was notorious. On the 17th of April she walked into the country, and when she returned it was observed that she no longer presented the obvious signs of pregnancy. She subsequently confessed that she had given birth to a living male child, which she threw into the river Eger. Suspicions having arisen that she had made away with her infant, she was examined, and it was ascertained that she had been recently confined. She was therefore arrested. While in prison she was seized with labour-pains, and a mole was expelled on the 23rd of June. She denied altogether that she had had connection during the interval after her confinement, and there was evidence to show that her statements were correct. Moreover, the mole was too large to have been formed within the nine weeks which had elapsed. It was therefore concluded that it was the result of the degeneration of an ovum impregnated at the same time as that which

* 'Vjhrsschrft. f. ger. Med.,' N. F., Band v, p. 70.

† Ibid., p. 22.

formed the child born in April. The interest of this case from a medico-legal point of view is, as Fischer remarks, that if the woman had denied having previously given birth to an infant, the fact of the mole being discharged would probably have led to the belief that she had not been confined, and therefore to her acquittal on the charge of infanticide.

Infanticide.

Kristeller* has recorded a case in which the *vagitus uterinus* was observed. It occurred in a woman who was pregnant for the third time. When Kristeller was called to her the membranes were found to be ruptured. The pains had been completely suspended for 4 hours. One arm of the child presented. He replaced the arm, and, finding that he could not succeed by ordinary manipulation, he endeavoured to bring the head into the pelvis by means of forceps. While he was trying to get hold of the head with the blades of the instrument he distinctly heard the child utter a muffled cry. This was repeated several times—in fact, whenever the child was touched with the forceps. When Kristeller took the foot of the child in order to turn, the *vagitus* was again heard several times, and he could plainly feel the inspiratory movements of the thorax and the pulsation of the funis. After the extraction of the child, however, no pulsation could be felt. The respiration, too, had ceased, although the beating of the heart could still be detected. The child, however, recovered.

Prof. Maschka† records the following case:—An infant recently born was found in a privy. The lungs were imperfectly distended, of a dirty red colour, and covered with numerous air-vesicles; their tissue was bloodless. They floated in water; but after the air-vesicles on their surface had been pricked, and the organs themselves had been gently squeezed, they sank and remained at the bottom of the vessel. Their condition, therefore, afforded no proof of live birth; indeed, the heart itself floated from decomposition. The mouth, larynx, trachea, and bronchial tubes down to their finer ramifications, were, however, filled with sand, faecal matter, and remains of vegetable substances. When incisions were made into the lungs sand and small drops of faecal matter were seen on the cut surfaces. From these facts Prof. Maschka drew the conclusion that the infant had breathed after having fallen or having been thrown into the privy. The mother's statement was that she went to relieve her bowels and fainted, and that on recovering from her swoon she found that the child had been expelled and had fallen into the privy.

Prof. Breslau‡ has made some original observations as to the condition of the intestines in the foetus. The following are his conclusions:—1. In children born dead (whether they have died during birth or have been long in a state of decomposition within the uterus) there is never any accumulation of gas, either in the stomach or in any part of

* 'Monatschr. f. Geburtsk.,' xxv, 5; 'Prag. Vjhrsschrft.,' 88, p. 121.

† 'Vierteljahrsschrift f. ger. Med.,' N. F., Band ii, 1865, p. 87.

‡ 'Monatsschrift f. Geburtskunde,' Bd. xxv, Heft iii; 'Prag. Vjhrsschrft.,' 87, p. 94.

the intestinal canal. 2. The intestinal canal of newly born infants never, therefore, floats in water, either as a whole or in small portions; it at once sinks to the bottom of the fluid. 3. The presence of gas in the alimentary canal begins with the respiration; it occurs in the stomach first, passing downwards from this organ; it is independent of the ingestion of food. 4. The swallowing of air from without is probably the first thing which leads to the accumulation of gas in the stomach and intestines. 5. Gas may be present in these cavities as soon as the first inspiratory movements have been made. 6. As respiration becomes more complete and has been longer established, the different coils of intestine become more and more distended. This may be determined by percussion of the abdomen, both in living children and in those prematurely dead.

Insanity.

The following case related by Rupprecht* is of interest, as bearing on the question as to the criminal responsibility of epileptics. B—, æt. 42, was accused of theft. He had bought of W— a quantity of wood for seven and a half thalers. This wood formed only a part of the stock possessed by W—, and B— carried off all this, and not merely that which had been sold to him. He did not attempt to conceal what he had done, and asserted that he had bought the whole quantity of wood from W—. This, however, was proved to be incorrect by the evidence of two witnesses, who confirmed the statements of W—, that only part of the wood was sold to B—. Moreover, the price paid corresponded to this view of the matter.

For fifteen years B— had suffered from epilepsy. The attacks were frequently repeated, and were followed by sleep of two or three days' duration. For the last year, however, no regular fits had occurred; but he had been affected with a kind of *petit mal*, which came on generally several times a day, in the forenoon. He would remain motionless for some minutes, or fall to the ground. It was proved that after these attacks he lost for a time the memory of the most common circumstances, his age, the date of the year, the names of his children, &c. Even after he had apparently recovered, his memory still remained deficient for some hours, for he subsequently remembered very imperfectly whatever had been said to him at these times.

For some years past his mental powers had been failing, and his memory becoming weak. It had, however, been noticed that he was inclined to avarice and love of money.

There was also an hereditary tendency to insanity. B—'s father had been a man of defective intellect, of melancholy disposition, pursued by suicidal impulses. His mother was insane, and had been confined for some months in an asylum.

The conclusion drawn by Rupprecht from these facts was, that B—'s intelligence had probably been impaired at the time when the bargain was struck; that he did not subsequently remember the terms of the

* 'Vjhrsschrift. f. ger. Med.,' N. F., B. v, p. 1.

agreement, and that he was not guilty of theft. He was consequently acquitted.

Life Insurance.

In Dr. Taylor's recent work on 'The Principles and Practice of Medical Jurisprudence' (1865, Churchill and Sons, pp. 1135) is a chapter on *life insurance*, containing a large amount of information, which must be of great importance to the profession in this country so long as every medical man is liable to be called upon to give certificates with reference to the health of persons desiring to insure their lives. It is, therefore, remarkable that this subject should never before have been discussed in any medico-legal work. A full translation of Dr. Taylor's paper is given in the 'Annales d'Hygiène'* by M. Tardieu, who has added, in brackets, certain remarks of his own. Of these intercalated passages, perhaps the most interesting is one which contains copies of the forms of certificate adopted by several French offices, by one Spanish, and also by a German office. The duty of private medical practitioners in reference to certificates for insurance of the lives of their patients has been much discussed in France. It has been maintained that the secrecy of a medical man with reference to the diseases of his patients should be inviolable, and that it should be a rule of professional etiquette to refuse certificates for insurance, whatever the state of the person's health, on the ground that much injury may be done to those who are the subjects of disease by allowing them to become aware that they are otherwise than healthy. M. Tardieu states that two medical societies (one in Paris, the other at Toulouse) have passed resolutions binding their members to refuse certificates under all circumstances, leaving it to the medical advisers of the companies to ascertain for their clients the state of health of persons proposing their lives for insurance. M. Tardieu does not himself acquiesce in this rule; but he thinks that it would be better for insurance societies to content themselves with the opinion of their own medical men, no longer asking for any information from the practitioner who attends the proposer.

Dr. Taylor's observations are incapable of condensation. I can therefore only draw the attention of medical men to them.

* 1866, 2ème série, cxxv, p. 383.

REPORT
ON
MATERIA MEDICA AND GENERAL
THERAPEUTICS.

BY
DR. C. HILTON FAGGE.

DURING the last two years very few new remedies have been introduced into medical practice. The following, however, may be mentioned:

Mudar.—Mr. J. J. Durant* has found this drug, the bark of the root of the *Calotropis gigantea*, an excellent substitute for ipecacuanha in the treatment of dysentery among the natives of India. He begins by giving a scruple of the drug, and seldom goes beyond drachm doses. He states that mudar, like ipecacuanha, is a reliable cholagogue, and that it is a sedative to the muscular fibres of the intestines, and particularly of the rectum and colon, rapidly allaying all pain, tenesmus, and irritation, and putting a stop to dysenteric action.

Erodium cicutarium.—Dr. Abbotts Smith† recommends the use of this herb in the treatment of certain forms of dropsy. The best preparation is the decoction of the dried plant, of which two ounces are to be added to three pints of water, and boiled until the liquid measures two pints. The average dose is three ounces of the decoction, four times a day. Dr. Smith relates two cases, one of ascites and anasarca from Bright's disease, the other of ascites from enlargement of the liver, in each of which the use of this herb is stated to have been followed by rapid disappearance of the dropsy. In the first case the ordinary diuretics and hydragogues had been given without any benefit. All that is said as to the mode of action of the drug is that it possesses diuretic and local tonic properties.

Dr. Henderson‡ has proposed two new remedies, both which he has found very valuable in gonorrhœa. One is the oil of yellow sandal-

* 'Indian Med. Jour.,' May, 1866; 'Lancet,' 1866, ii, p. 22.

† 'Ed. Med. Jour.,' 1864, p. 380.

‡ 'Med. Times and Gaz.,' 1865, i, p. 571.

wood, obtained by distillation from the *Sirium myrtifolium*, a tree which grows in the East Indies. The other is the oil of the *Dipterocarpus turbinatus*, well known as having often been used fraudulently as a substitute for copaiba.

Vogl* has investigated the cause of the styptic property of Penghawar, a drug which was first imported from Java into Holland some twenty-three years ago, and which has been introduced into the Dutch Pharmacopœia, and has enjoyed so great a reputation that it has become an article of commerce. It consists of the frond-stems of certain tree-ferns (species of *Alsophila*, *Choonophora*, and *Balanium*), these stems being covered with hair-like scales of a bronze or brownish-yellow colour, and of a silky lustre. In Java this substance has long been known as a styptic, under the name of Pakoe-kidang. It had been employed by Vinke, according to whom it stops hæmorrhage, even arterial (unless the diameter of the artery be more than $1\frac{1}{2}$ "), more rapidly than any other application. He ascribed its power of controlling bleeding to capillarity, the scales being made up of jointed tubes which absorb the watery part of the blood, and at once swell to five times their size. Vogl shows that alkaline liquids exert a particularly rapid action on the hair-like scales, dissolving the cell-contents, and making the cell-membranes swell up. Thus, these bodies, when applied to a bleeding surface, rapidly abstract the fluid part of the alkaline blood, leaving the fibrin to coagulate.

Jurubeba.—M. Stanislas Martin† describes a drug which is known in Brazil under the name of jurubeba. It consists of the leaves, fruit, and root of the *Solanum paniculatum*. In South America various preparations of it are used—the plaster, syrup, wine, tincture, alcoholic extract, and aqueous extract. It is employed in intermittent fevers, affections of the liver and spleen, vesical catarrh, anæmia, chlorosis, dropsy, and difficult menstruation. According to numerous certificates furnished to M. Martin, it is the most powerful tonic and deobstruent which exists in the materia medica.

Our knowledge as to certain drugs of which the botanical source had long been obscure has been considerably increased of late. Thus, Mr. Hanbury‡ appears at last to have cleared up the doubt which so long prevailed as to the precise source of the gamboge of Siam. He obtained from Messrs. D'Almeida, of Singapore, numerous specimens of a gamboge-tree cultivated by them. These specimens were found to have the male flowers pedicellate, as has been stated by Dr. Christison. In all other points they corresponded perfectly with the *Garcinia morella* of Desrousseaux. The plant is therefore denominated *G. morella*, var. β , *pedicellata*.

The same pharmacist§ seems to have at length determined the source of the "Savanilla Rhatany," a drug of which the botanical nature was previously unknown, but which has to a great extent super-

* 'Oesterr. med. Jahrbücher,' Jahrg. xxi, p. 227.

† 'Bull. Gén. de Thérap.,' Jan. 15, 1866.

‡ 'Pharm. Jour.' vi, p. 349. § 1*ibid.*, p. 460.

seeded that obtained from Peru. Mr. Weir procured for him specimens of the plant from the vicinity of Jiron, whence the drug is obtained. These specimens were ascertained to belong to the *Krameria Ixina*, L., forming a variety which Triana had already distinguished as *K. Ixina*, var. β , *granatensis*.

Dr. Fred. Farre* has endeavoured to ascertain from Chinese books and MSS. the source and exact localities of the Chinese rhubarb-plant. His inquiries have not enabled him to determine whether Chinese rhubarb is the product of one species only or of several. The descriptions of different Chinese writers do not in all respects coincide, but the contradictions are rather apparent than real. The most important point is the statement of Su-sung, that the leaves of the Shen-si rhubarb-plant resemble those of the castor-oil plant, the only known species of *Rheum* to which this would apply being the *R. palmatum*.

The most important paper which refers to the adulterations of medicines is, perhaps, one by Prof. Bentley,† who describes an instance in which saffron was sophisticated by the admixture of the stamens of crocus with the style and stigmata, of which parts alone the genuine drug is made up. This adulteration appears not to have been previously noticed. The odour of the impure saffron was much less penetrating and aromatic than that which ought to be possessed by this substance. A very ready way of detecting the adulteration in question is to take a small portion of the suspected specimen and diffuse it in cold water with a stirring rod for about a minute. The water will become immediately coloured, and, if the stirring be discontinued, the whole mass will rise to the surface, when the genuine orange-yellow saffron will be readily distinguished from the pale yellow twisted stamens. The specimen examined by Prof. Bentley contained only about one third of true saffron. The stamens had been dyed with some colouring matter, to give them a resemblance to the genuine drug.

It is well known that the root of the *Aconitum napellus* has several times been mistaken for that of the horseradish, with fatal consequences. Last year some serious and fatal accidents arose from the sale of aconite root for jalap. It appears‡ that a merchant at Constantinople received from Calcutta a parcel of a drug which he supposed to be jalap, and which he disposed of as such. The consequence was that a fatal case of poisoning soon occurred; and on examination it was found that the drug really consisted of the root known in India as *Bikh*, and generally attributed to the *Aconitum ferox*. It is stated by the writer in the 'Pharm. Journ.' that there is, in fact, a certain distant resemblance between some of the larger roots of the Indian aconite and the small and inferior jalap tubers that have of late appeared in the market.

Mr. Miller§ has proposed a test for methylic alcohol, in the presence of ethylic alcohol and volatile oil, based on the fact that formic acid is

* 'Pharm. Jour.,' vii, p. 375.

† Ibid., p. 452.

‡ 'Ztschrft. d. allg. öst. Apotheker-Vereines,' 16 Juni, 1865; 'Pharm. Jour.,' vii, p. 58.

§ 'Pharm. Jour.,' vi, p. 534.

produced in comparatively large quantity by the exudation of the former alcohol, but in traces only by the oxidation of the latter. He puts into a small distilling apparatus sixty grains of powdered bichromate of potass, and pours upon it one ounce of water and ninety grains of sulphuric acid, and then adds one drachm of the spirit supposed to contain methylic alcohol. The mixture is allowed to stand for fifteen minutes, after which one fluidounce is distilled. The distillate is neutralized with carbonate of soda, and is boiled down nearly to dryness. Water is then added to make up the quantity to four fluidrachms, and the solution is rendered slightly acid by a drop or so of acetic acid. If methylic alcohol was originally present, the liquid will become turbid and opaque when treated with a solution of nitrate of silver, and, on boiling very gently, a coating of metallic silver will be deposited on the interior of the tube. If the fluid originally employed was pure ethylic alcohol, the nitrate of silver will merely cause slight darkening of the contents of the test-tube and the deposition of a minute dark precipitate. In testing a tincture for the presence of methylic alcohol it is generally necessary to perform a preliminary distillation before adding the sulphuric acid and bichromate. In applying this test to the *Spiritus Ætheris Nitrici* the liquid may first be shaken with ignited carbonate of potass, and then distilled after standing an hour. Even when the preparation is pure, however, the darkening observed is somewhat more marked than with rectified spirit.

A more simple test for methylic alcohol, proposed by Mr. Tuck,* consists in boiling the suspected liquid with a few drops of an alkaline solution of the double iodide of potassium and mercury. If the liquid is pure ethylic alcohol a yellowish-white precipitate is formed, but when methylic alcohol is present no such change occurs. The absence of the precipitate in the latter case appears to be due to the acetone which is always associated with methylic alcohol. It has since been shown† that the oil of cloves has the same effect on the "iodo-hydrargyride test for alcohol" as acetone itself; but this substance may be readily separated by simple distillation. Mr. Tuck has distilled and tested in this way most of the tinctures of the *British Pharmacopœia*, and has not met with any other oil or organic principle which has interfered with the success of his test. At the same time he appears to admit that Mr. Miller's method is of a more absolutely certain character. The value of these tests has been fully recognised by Dr. Attfield and others. Mr. Miller has since made known‡ that his oxidation-test may be made to yield very fair results without distillation.

Mr. Tuck has investigated§ the question whether it is possible to ascertain, by chemical tests, that methylated spirit has been used in making chloroform or other pharmaceutical preparations. He finds that, as might be expected from theoretical considerations, the chloroform prepared from methylated spirit is as good as, and of the same chemical composition as, that made from pure alcohol. There can therefore be no test to distinguish between these products, and it has

* 'Pharm. Journ.,' vi, p. 153.

† Ibid., vii, p. 168.

‡ Ibid., p. 318.

§ Ibid., p. 172.

been stated that all the chloroform employed in the hospitals at Edinburgh is now made from methylated spirit. Ether which was derived from this source (and which contains probably nearly 10 per cent. of methyl-ether) can be detected by its having a much lower boiling-point; but, so far as Mr. Tuck knows, in no other way. In sweet spirits of nitre and in sal volatile the presence of methylic alcohol is very easily proved, either by the oxidation-test or by the iodo-hydrargyride of potassium.

The following notes refer to some of the principal papers concerning the manufacture and the preservation of medicinal preparations.

Mr. Balmanno Squire* has found that the dark yellow oil obtained from the seeds of *staphysagria* is as active as the powdered seeds themselves in destroying pediculi. The oil amounts to as much as half of the weight of the seeds. It is extracted by ether. A very good preparation of this drug may be made by digesting the crushed seeds in hot lard, but the ointment thus obtained has the disadvantage of being of a brown colour.

Mr. George Johnson† has examined the deposit which forms in bottles containing the *Vinum Ipecacuanhæ*. This deposit has generally been supposed to consist of inert substances, such as ulmin or mucilaginous matters; but Mr. Johnson finds that it is made up of two different substances, in varying proportions. One of these is bitartrate of potass derived from the wine, and presents large crystals; the other forms a yellowish, transparent, granular mass, which is shown to be ipecacuanhate of emetina. The nature of the wine used in making the preparation affects merely the proportion of bitartrate of potass in the deposit.

Mr. Umney‡ has investigated the cause of the gradual change to which the syrup of the phosphate of iron is liable, acquiring a reddish colour by age. He finds that it is chiefly due to exposure to the air; it occurs much earlier when the syrup is kept in bottles only partially filled. It is somewhat influenced by light, coming on more quickly when the preparation is placed in a green than when it is contained in a blue bottle.

The following notes are taken from some of the principal papers which have reference to the determination of the active principles of particular medicinal substances.

Hübler has obtained§ from the seeds of the *Colchicum autumnale* a principle to which he gives the name of colchicin. It will be remembered that, in 1857, Oberlin failed to extract the alkaline crystallizable principle described by Geiger and Hesse by the method which they recommended, and that he obtained an uncrystallizable resinous body, which had no alkaline reaction. When treated with hydrochloric or sulphuric acid, this substance yielded a neutral crystallizable principle, which

* 'Pharm. Jour.' vi, p. 405.

† Ibid., vii, p. 179.

‡ Ibid., viii, p. 129.

§ 'Jen. Ztschrft. f. Med. u. Naturw.' i, 3, p. 247; 'Schmidt,' 125, p. 292.

Oberlin termed colchicein. Now, according to Hübler, this does not exist as such in the seeds, but is merely a product of the decomposition of the colchicin. Colchicin itself is described by Hübler as having the following characters:—It is of a sulphur-yellow colour, readily soluble in water and alcohol, quite insoluble in ether. It has a very bitter taste, and an aromatic odour resembling that of hay. It has a neutral reaction. It is unaffected by chloride of platinum, neutral chloride of iron, neutral or basic acetate of lead, or sulphate of copper. Acids and alkalis colour its solution yellow. Chloride of gold gives with it a yellow, chloride of mercury a flocculent white, precipitate. Tannic acid yields, even with very dilute solutions, a white cheesy precipitate. If two or three drops of sulphuric acid be added to a few granules of colchicin in a watch-glass, and if the granules be broken up quickly with a glass rod, the fluid round the colchicin will acquire a dark green colour. This will pass into a yellow tint as the colchicin comes into contact with more of the sulphuric acid and dissolves in it. Now, if a drop of nitric acid be added to the yellow liquid, a dark blue zone will appear where the two meet; and when they are stirred together the blue colour will be converted into a violet, and will then become brown, and ultimately yellow. On the addition of ammonia a red (*zwiebel-roth*) liquid will be obtained, which is turned yellow by acids, but becomes again red when fresh alkali is added to it. Colchicin remains unchanged when heated, until a somewhat high temperature is reached. Its composition, according to Hübler, is $C_{34}H_{19}NO_{10}$. Some experiments on animals, made by Dr. Seidel, showed that this principle is poisonous. Two moderately large dogs, to each of whom '77 grain of colchicin was given, died with the usual symptoms. Herbivorous animals appear to be less affected by it; at least a grain and a half of colchicin produced no effect whatever on a rabbit.

According to Vée and Leven,* the physostigmin of Jobst and Hesse† is a mixture of various bodies, among which is a crystallizable alkaloid, present in considerable quantity. Vée and Leven propose to term this *ésérine*. It crystallizes in very small rhombic plates, coloured by polarized light. It has a very feebly bitter taste, which develops itself somewhat slowly. It is soluble in ether, alcohol, and chloroform, but very slightly soluble in water, to which, however, it gives a marked alkaline reaction. A single drop of a solution containing a thousandth part of *ésérine*, applied to the human eye, causes extreme and long-continued contraction of the pupil. Some experiments on guinea-pigs with it showed that the pupils were unaltered, or even dilated rather than contracted, when this principle had been injected beneath the skin. The same thing, however, occurred when the extract of Calabar bean was injected in a similar way.

Dr. W. Preyer‡ has succeeded in detecting a crystallizable alkaloid in the woorara poison. He gives to this principle the name of *curarin*. It is peculiar in being (except araribin, obtained by Kieth from the *Arariba rubra*) the only crystallizable vegetable alkaloid containing no

* 'Gaz. Méd. de Paris,' 51, p. 782, 1864.

† See the 'Year-Book' for 1864, p. 447.

‡ 'Comp. Rend.,' lx, p. 1327; 'Schmidt,' 128, p. 171.

nitrogen. Unlike araribin, it is not volatile. It is a very bitter substance, and is very hygroscopic. Both the alkaloid itself and its salts crystallize in colourless four-sided prisms. It is dissolved by water and alcohol in all proportions; but it is only sparingly soluble in chloroform, and it is insoluble in ether, if free from water. With strong sulphuric acid pure curarin gives a splendid blue colour, which is very persistent; with sulphuric acid and bichromate of potass it yields the same reaction as strychnia, except that the violet colour lasts for a longer time. Concentrated nitric acid gives with it a purple-red tint.

Bernard has found that curarin produces the same physiological effects as the woorara poison, but is 20 times as active. A rabbit was killed by a milligramme injected beneath the skin. Woorara from which this principle has been extracted is inert.

Mr. Groves* has endeavoured to determine whether aconite contains, besides aconitina, any volatile acrid substance, such as has been supposed to exist in it by M. Geiger and others. He concludes that neither the green plant nor the bruised fresh root contains any such principle. The analogy of other plants belonging to the same order is not, he urges, really in favour of its existence. It is true that anemone and ranunculus furnish volatile acrid bodies; but these are the chief active principles of the plants in question.

Dr. Daniell† has detected the presence of theine in the Kola nuts of tropical West Africa, the Guru nut of Soudan (the seeds of the *Kola acuminata*). This discovery, which is confirmed by the careful analysis of Dr. Attfield, is of interest, because it adds another to the list of substances which are used in different parts of the world, by uncivilised as well as by civilised peoples, and which contain the same principle, although they have no botanical affinities. It would seem that the fresh kola nut is generally employed, and that it is chewed, the juice being swallowed, and the solid part ejected from the mouth. Dr. Attfield found 2.13 per cent. of theine in the dried nuts.

Husemann‡, of Göttingen, has made some investigations with reference to the chemical composition and physiological action of the seeds of the *Wrightia antidysenterica*, a small forest tree, which is tolerably abundant throughout Western India. These seeds have lately been described by Flückinger under the name of Semina Indageer; they appear to be identical with those in which Stenhouse found an alkaloid termed by him Wrightine. Dr. Haines§ has proposed the name of Conessine, derived from the Hindustani name of the bark, for an alkaloid which appears to be identical with that discovered by Stenhouse, but which is derived from the bark of this tree. In India the seeds are supposed to have an anthelmintic action, and (like the bark of the plant) have been employed in the treatment of dysentery, diarrhœa, flatulence, disorders of digestion, and hæmorrhoids. Husemann found

* 'Pharm. Jour.,' 1866, viii, p. 118.

† Ibid., vi, p. 450.

‡ 'Hannov. Ztschr. f. prakt. Heilk.,' ii, 6; 'Grævell's Notizen,' N. F., ix, p. 673.

§ 'Pharm. Jour.,' vi, p. 432.

that their chief action is on the muscular system, and is itself the result of an interference with the cerebral functions. This drug must, therefore, be regarded as a narcotic, so far as the higher animals are concerned. Hence the use of the seeds is not to be recommended in those diseases in which they have been employed in India.

Messrs. J. and H. Smith* give directions for the preparation of thebolactic acid, a new body, discovered by them in opium. The process depends on the ready solubility of the thebolactate of lime. The acid itself is isomeric with lactic acid; and it is doubted by Dr. Anderson whether these acids are not identical. The yield of thebolactate of lime from Turkey opium has generally been about 2 per cent.

Husemann and Marmé† have investigated the chemical constitution of the *Helleborus niger* and the *H. viridis*. They have recognised in these plants two active principles, both glucosides, and both free from nitrogen. Of these, one, to which they give the name of helleborein, is contained in much larger quantity in the *H. niger* than in the *H. viridis*, although even in the *H. viridis* it is present in larger amount than the other principle. This last, which they term helleborin, is identical with the body described by Bastick under that name. It is much more abundant in the *H. viridis* than in the *H. niger*, being, indeed, present only in traces in the latter drug. Husemann and Marmé prepared it by a process nearly identical with that recommended by Bastick.

Helleborein crystallizes from very concentrated alcoholic solutions in masses formed of transparent minute needles. When exposed to the air, these quickly become opaque and white, and form a yellowish-white, very hygroscopic powder. This has a sweetish taste; it is very soluble in water, but less so in strong alcohol, although in ordinary spirit it dissolves readily; it is insoluble in ether. When boiled with dilute acids it is readily decomposed into grape-sugar and a substance termed helleboretin, which forms flocculi of a violet colour.

Helleborin forms brilliant white needles, arranged in concentric groups. Its alcoholic solution has a very acrid taste. When placed on the lips it gives rise to a burning sensation, which lasts for hours. It is insoluble in water, and very little soluble in ether. The smallest traces of it may be recognised by the splendid red colour which it gives with sulphuric acid. When boiled with dilute acids this body splits up into glucose and *helleboresin*. The very considerable differences between Bastick's description of helleborin and that given by Husemann and Marmé are attributed by them to his having obtained the principle in very small quantity only, and in a very impure state. This is readily explained by the fact that he employed the *H. niger* in his investigations, for this species contains only a trace of helleborin.

In another communication‡ Marmé remarks that physiological experiments have shown that the roots of the different species of *Helleborus* must contain an active principle soluble in water; and that,

* 'Pharm. Jour,' vii, p. 50.

† 'Ann. d. Chim. u. Phar.,' xxxv, p. 55.

‡ 'Henle und Pf. Ztschrift.,' xxvi, 1, 2; 'Grævell's Notizen,' N. F., ix, p. 664.

therefore, neither the fatty oil, the resin, the volatile acid, nor the crystalline body of Bastick, can be supposed to be the principle to which the peculiar effects of these plants are due.

He has made many physiological experiments, not only with helleborin, helleborein, and helleboretin, but also with the oil obtained from the *H. viridis*, and with the product derived from the distillation of the *H. fœtidus* with water. The effects observed in different animals varied greatly, so that no general account of them can be given. In its action on the heart of the frog helleborein resembled digitaline, but it was more powerful than the latter substance, a smaller dose being sufficient to produce the characteristic effects. On the other hand, helleborin was found not to affect the heart's action or the respiration, but to cause death by paralysis of the nervous centres. Its poisonous action was much less intense than that of helleborein, and was more slowly manifested. Frogs were found to recover from doses of .6 of a grain. According to Marmé, the oil of the *Helleborus viridis* is inert if deprived entirely of helleborein and helleborin. Nearly an ounce of this oil was given to a dog without any ill-effects being produced. Helleboretin, also, has no poisonous action; in this it resembles digitaliretin, a substance obtained in a similar way from digitaline.

Prof. Schroff* discusses various points of interest with reference to the squill. It is well known that two varieties of this drug are found in commerce, the one white, the other of a reddish colour. In England the white kind, obtained from Malta, is considered to be the best. In France the red variety is generally used, being imported into that country from Spain. In Austria the red variety is employed in the recent state, obtained from Apulia; but the dried scales and the powder are made from the white. It has generally been considered doubtful whether these varieties of squill both come from the *Urginea scilla* of Steinheil, or are derived from different plants. Schroff is of opinion that they belong to the same plant. He found the white variety growing on the Acropolis at Corinth, 800 feet above the sea-level. The bulb differed slightly in form from that of the red kind, being more flattened and not so pear-shaped, but there was no doubt that it belonged to the *Urginea scilla*. Schroff thinks that the differences in colour depend on variations in the conditions under which the plant grows, the white form occurring especially in elevated situations, at a distance from the sea, and when the plant is exposed to sunshine and the bulb is not deeply imbedded in the soil. It had been supposed that the white variety might be derived from the innermost scales of the ordinary red bulb, these losing their colour during the process of drying. He shows, however, that this opinion is without foundation. On the contrary, a kind of dried squill, which is sold in Vienna as derived from the red variety, and is of a dirty white colour, belongs really to the white variety. It contains none of the cells filled with red pigment which are found in the true red squill. It has been stated that the bulb of the *Pancratium maritimum* is sometimes mixed with that of the squill

* 'Wien. Med. Wechnbl.,' xx, p. 389, 1864.

in commerce. Schroff has not found this to be the case. The presence of the *Panacratium* may be detected by the form of the scales, for the bulb of this plant is much smaller than that of the squill. Moreover, the former is, according to Landerer, incapable of producing the irritation of the skin which is caused by the latter.

There has been much difference of opinion whether the outer or the inner scales of the bulb of the *Urginea scilla* should be preferred for medicinal purposes. Schroff has made on rabbits a series of experiments which lead to the conclusion that the activity of the scales increases from the centre outwards, those close to the axis being entirely devoid of acridity, and, in fact, quite inert. It had been supposed that the outermost dry scales are valueless. But Schroff shows that, although they yield but a small quantity of extract, this is more powerful than that derived from any other part of the bulb. All these differences, however, are less marked in the white variety of the drug. With reference to the relative value of the two kinds, he finds that the red is greatly more active. It yields a considerably larger quantity of extract, both with alcohol and with water. In all cases a greater amount of alcoholic than of aqueous extract is obtained from the squill. Schroff advises that the outer two thirds of the scales should be used in making extracts of squill, those belonging to the inner third of the bulb being rejected.

It has generally been maintained that this drug contains a volatile acrid principle. The statement that handling the bulbs gives rise to lachrymation and sneezing is denied by Schroff, as it had already been by Oudemans. There is, however, an oily matter in the bulb, which is seen in the form of drops on microscopical examination. It is probably this which is the seat of the odour possessed by the drug, and it is not unlikely that it is an allyl-compound, containing sulphur. Schroff, therefore, does not deny that squill contains an acrid volatile principle, but merely says that this does not give rise to sneezing or lachrymation. The acidity of the drug was very markedly displayed by the extract made from the outermost scales of all. When some of this extract was placed in contact with the mucous membrane of the mouth it produced a most disagreeable burning sensation, lasting for hours, and accompanied by salivation. In the animals poisoned by this extract, too, the signs of irritation were very marked. The stomach was not merely injected, but presented extravasations of blood, and erosions extending to the submucous tissue.

The acrid principle contained in the drug has generally been supposed to be the cause of the irritation of the skin to which the fresh bulb gives rise, and which is attended with an eruption of erythema, and even of vesicles. Schroff, however, shows that these effects are not due to any such principle, but are produced mechanically by the raphides which are so abundant in this plant, and which have very fine points. For, if the juice be filtered, it no longer causes any irritation, although no constituent is removed except the crystals. On the other hand, if the fresh juice be washed with water until it is perfectly tasteless, it will deposit a number of these crystals, and by them the same irritation of the skin may be produced as by the fresh juice

itself. It is said that the acrid principle is dissipated by drying the bulb. But if the dried scales are softened with water and rubbed over the surface of the skin, they give rise to just the same effects as when the recent juice is brought into contact with the same part. The crystals are found by Schroff to be composed of oxalate of lime, and not of the citrate or tartrate, as had been asserted.

The active principle of this drug has not yet been isolated. The name of scillitin has been applied to matters of various kinds. Schroff experimented with a substance prepared by Merck, of Darmstadt, under this name, but it was merely a very bitter brownish extract. Experiments on rabbits showed that its action was mainly on the nervous system. The animals became very feeble, and dragged their hind legs after them. Trembling afterwards came on, and intense fits of shivering, in which the hind legs were spasmodically drawn forwards. The pupils were dilated. The breathing became slower, and death occurred by paralysis of the heart. In animals poisoned by scillitin the stomach and intestines were but slightly injected.

The effects of the ordinary extract of squill, prepared from the outer (but not the outermost) scales, were less purely nervous than those of the scillitin, and showed that this part of the bulb contains an acrid matter. The strength of this extract was found to be 12 times as great as that of the bulb itself.

Schroff's experiments confirm the general opinion that squill acts especially on the urinary and on the respiratory organs. The kidneys were found engorged, and the urine was increased in quantity, or even contained blood. The more abundant the acrid principle in the extract, the more were the lungs found to be affected.

He thinks that the medicines of which the action approaches nearest to that of squill are colchicum and helleborus. He says that it does not exhibit that specific action on the heart which belongs to digitalis. Concerning this point, however, I may refer to some experiments of which I have spoken in the Report on Medical Jurisprudence when treating of the application of physiological tests for poisons.

Prof. Bernatzik* has continued his investigation† of the therapeutic value of the different constituents of cubebs by administering these various principles in cases of gonorrhœa. The results which he has obtained differ very widely from those which he had anticipated. From the fact that the ingestion of the volatile oil of cubebs leads to the presence of a large quantity of resinous matter in the urine, he had inferred that the oil is the principal active ingredient of the drug, as it is, undoubtedly, the substance to which the peculiar taste is due. However, a medical man affected with a recent gonorrhœa took two drachms of the oil daily for some days, and continued the treatment for 3 weeks without any good result. The conclusion that the oil possesses no therapeutical value in gonorrhœa was confirmed by experiments, in which the resinous substances obtained by oxidation of the oil were

* 'Prag. Vjhrsschrft.,' lxxxv, p. 81.

† See the 'Year-Book' for 1864, p. 434.

injected into the urethra in cases of gonorrhœa. These resinous substances resemble those found in the urine after ingestion of the oil. They proved inert, failing altogether to produce any amelioration in the disease.

The cubebin, and the soft resin left after the removal of the cubebin, were next administered to patients with gonorrhœa. Each of these substances was found to be entirely deficient of curative power.

On the other hand, the cubebic acid turned out to have a decided therapeutical value in recent cases of gonorrhœa. The crystallized acid was made into pills, each containing a grain and a half. The patients began by taking from 5 to 20 of these pills daily, the number being increased every day. Of 5 patients to whom cubebic acid was administered, 3 were cured completely within 6 days; and in the remaining 2 the discharge was very much lessened, so that a few injections sufficed to remove it. In a case of chronic gonorrhœa, however, the administration of the cubebic acid failed entirely. Moreover, cubebic acid was in one case employed in combination with magnesia, and in another as cubebate of soda. These preparations did not give very satisfactory results. Mixtures of cubebic acid and of the volatile oil were given to other patients, and produced a diminution of the disease; this is ascribed by Bernatzik entirely to the cubebic acid. From these experiments Bernatzik concludes that the following preparations of cubebs would be preferable to all others:—1. "*Cubebæ oleo æthereo privata in pulvere subtili.*"—Simple distillation, although it does not completely remove the volatile oil, at least takes it away to a sufficient extent to enable the residue to be administered in adequate doses without inconvenience. He proposes to give from 2 to 4 drachms of this preparation in the form of an electuary, several times a day. The quantity taken during the 24 hours ought to be from 750 to 1000 grains, for the cubebic acid would only form about 4 per cent. of it. 2. "*Extractum Cubebarum resinosum.*"—This would be obtained by digesting the preparation last named, for a considerable time, with 90 per cent. alcohol. Cubebic acid would constitute more than a fourth part of the extract thus obtained, so that the daily dose would be about 120—160 grains. 3. "*Acidum resinosum Cubebarum.*"—The cubebic acid itself. The best way to administer it is in the form of pills, made up with soap and Pulv. Althææ, the resin being first melted in a hot mortar, and some alcohol being added to it while in the liquid state.

Dr. Naumann publishes* some experiments made with the object of ascertaining whether the good effects of cod-liver oil in tuberculosis and lupus can be attributed in any way to its physical properties. In the first place, he has found that cod-liver oil passes through animal membranes with much greater facility than any other animal or vegetable oil which he tried. The different oils were placed in tubes closed by a piece of membrane, through which they were either forced by the pressure of a column of mercury or drawn by exhausting the space

* 'Archiv d. Heilkunde,' 1865, p. 536.

these manufactories. 4. That among all the workwomen at a particular time there was but one who suffered from chlorosis. (From this fact Pécholier and Saintpierre infer that verdigris has an action similar to that well known to be possessed by iron, gold, and manganese, and that its manufacture may do good to girls who are chlorotic.) 5. That verdigris acts locally as an irritant. Its powder, therefore, often gives rise in the workwomen to slight forms of ophthalmia or to coughs, and those who are predisposed to such complaints should avoid this occupation. 6. That, on the whole, the manufacture of verdigris is not injurious to the public health.

Mr. Whalley* relates a case in which it appeared that the symptoms arose from the use of "magenta dust" in printing. The patient was a boy, æt. 13; his lips, nose, and eyelids, were swollen; his skin was hot and his urine scanty; he complained of his throat feeling dry, of a dry cough and intolerance of light, and also of great prostration, nausea, and sickness. The tongue was coated with a brown fur, the bowels were confined, and there was loss of appetite. These symptoms came on the day after the boy had been using magenta dust, which was found to contain more than sufficient arsenic to account for his illness. His mother stated that once before he had suffered from a similar attack after dusting with magenta for two days.

Scheidemann† has made some observations as to the cause of the serious symptoms which sometimes present themselves in the men employed in the construction of mines for military purposes. During the year 1862, at the siege of Graudenz, he had opportunities of investigating this question, to which attention had previously been directed by Josephson and by Rawitz.‡

The effects on the men employed in these mines are due to the deleterious gases generated during the explosions by gun-cotton or gun-powder. It is true that, when the galleries are long, the air in them becomes impure even before the mine is fired; but it is easy to maintain sufficient ventilation to prevent any injury to the men. The gases produced by the explosion of a mine are, however, much more difficult to get rid of. They saturate the soil for a considerable distance round the point at which the mine was sprung, and impregnate especially the pieces of turf and other substances with which the gallery had been filled up in order to resist the force of the explosion. In fact, it is only after the gallery has been ventilated for some hours that the work can be recommenced. Even then, and particularly while the materials which fill the extremity of the gallery are being removed, or when the mine is being carried through ground saturated with gases by the explosion, the men are liable to be attacked by the affection to which Josephson drew attention, and which he termed the "Minenkrankheit."

This observer ascribed the symptoms produced under these conditions mainly to the sulphuretted hydrogen generated by the explosion of the powder. Scheidemann disputes the correctness of this opinion. He

* 'Med. Times and Gaz.,' 1866, ii, p. 222.

† 'Vjhrsschrift. f. ger. Med.,' N. F., v, 1866, p. 177.

‡ See the Sydenham Society's 'Year-Book' for 1863, p. 460.

found that there was much less smell of sulphuretted hydrogen in a mine in which several men had been taken ill than is often observed near sewers and privies. Moreover, precisely similar symptoms manifested themselves in galleries in which gun-cotton had been employed to fire the mine; and such attacks were actually more frequent and more severe than when gunpowder was used. But the explosion of gun-cotton generates no sulphuretted hydrogen. One of the facts mentioned by Josephson in support of his view is that this gas can be detected chemically in the breath of those who are affected in this way; this is supposed by Scheidemann to have been an error of observation, arising from the fact that the air in the neighbourhood of a gallery in which gunpowder has been exploded is sure to contain sulphuretted hydrogen. He asserts that the symptoms, as described by Josephson and as observed by himself, are not more like those of poisoning by this gas than those produced by other noxious gases. Indeed, there is a perfect similarity between these symptoms and those due to carbonic oxide, and particularly to charcoal vapour. He insists particularly on the following points:—1. In the “*Minenkrankheit*” a characteristic frontal pain is always present, which cannot be constant in cases of poisoning by sulphuretted hydrogen, as no mention is made of it by Hallé or Orfila. 2. In poisoning by the gas in question there are much more severe symptoms of gastric and intestinal irritation. 3. Convulsions are present even in the slightest cases of poisoning by sulphuretted hydrogen, and always precede the asphyxia. 4. The pulse is small and weak in these cases, whereas in the “*Minenkrankheit*” it is large and full. 5. The skin is always cold in the former affection; Josephson states that its temperature is normal in the latter, although Rawitz and Scheidemann both found it often very low. 6. Recovery is much slower after poisoning by sulphuretted hydrogen than in the affection to which miners are liable.

Now, the quantities of carbonic acid and carbonic oxide produced by the explosion of gunpowder or gun-cotton appear to be quite sufficient to account for the symptoms observed. Scheidemann therefore ascribes them to these gases, and especially to the carbonic oxide, admitting at the same time that the diminution in the quantity of oxygen and the presence of sulphuretted hydrogen are in part concerned in their production.

The frequency with which these attacks occur during mining operations appears from the fact that, on one occasion, out of twenty men employed in a gallery, only two were able to go on working at the end of half an hour.

The opinion that carbonic oxide, and not sulphuretted hydrogen, is the cause of these symptoms is confirmed by the analyses made by Dr. Poleck of air taken from galleries of mines made during the siege of Neisse. Eulenberg also has expressed the same view in his work entitled ‘*Die Lehre von den schädlichen und giftigen Gasen.*’

For the purpose of preventing these attacks, Scheidemann advises that the workmen should inhale through sponges soaked in a solution of chloride of copper. This liquid is very absorbent of car-

bonic oxide, and experiments on rabbits lead to the conclusion that its employment will probably delay very considerably the ill-effects of breathing the air of mines after explosions. Scheidemann gives drawings of a "respirator" which he recommends to be worn under these circumstances. The mouth-piece is of such a form that it can be held between the teeth. It has two apertures, of which one leads to the external air, while the other communicates with a tube passing into a vessel fixed round the body by a strap, and filled with small sponges soaked in the solution of chloride of copper. The tongue is used to close the former of these apertures during inspiration, the latter during expiration, and thus no valves are required.

Within the last two years a very important inquiry has been carried out, by the direction of the Privy Council, in reference to the housing of agricultural labourers and of the poor in towns. This inquiry is necessarily imperfect, being (in Mr. Simon's words) "only an examination of samples;" but there is no doubt that the results arrived at are generally trustworthy. Dr. Hunter's report* confirms to the fullest extent the opinion which generally prevails as to the insufficiency and miserable character of the house-accommodation for agricultural labourers, and as to the action of the present Poor Law in inducing the owners of land to do away, as far as possible, with the cottages on their estates. It is said that within the last twenty or thirty years this evil has been in very rapid increase, and that it is now more difficult for the agricultural labourer to find suitable house-room than has for centuries been the case. Dr. Hunter has compiled from the last census-returns evidence that in 821 separate parishes or townships of England the destruction of houses has been going on within the last decennial period, notwithstanding increased local demands for them. He suggests that the building of "model cottages" of extravagant cost and unnecessary size is in some respects to be deprecated rather than recommended. The expense of such cottages is so great that sufficient numbers of them are not likely to be built, and they are often so good that they are very apt to fall into the hands of persons in a better position than the labourers for whom they are constructed. One of the most powerful causes of insufficient cottage-accommodation is, in fact, the system of "close" and "open" villages, which prevails through the midland and eastern parts of England. There are in all counties *show villages*, where the cottages have been reduced to but a few, and where none but persons who are needed as shepherds, gardeners, or gamekeepers, are allowed to live. Thus, nearly all the tenants are regular servants, and receive the good treatment usual to their class. The agricultural labourers are not the tenants of the owner of the land, but come from an "open village," perhaps three miles off, where a numerous small proprietary received them when their cottages were destroyed in the close villages around. It is usually affirmed that these open villages are a great

* 'Seventh Report,' &c., Appendix, p. 126.

nuisance, that they are "enough to breed a pestilence," and that they show how much worse off a country must be where the owners are small and poor, and demand rents beyond the means of the labourers. But it is argued by Dr. Hunter that they are in reality the necessary complement of the close villages, with their neatness and beauty, and that, were it not for the small owners, who let the cottages to the poor, the latter would have to sleep under the trees.

Still, the condition of the cottages in these villages is most deplorable. They are abandoned by persons of competent means—the penal settlement for people of bad character from all the country round. One sees miserable hovels, neglected cabbage-gardens. The labourers' houses are usually in rows, built with their backs against the extreme edge of the plot of ground which was at the disposal of the builder. Hence they are not allowed light or air, except from the front.

Of 5375 cottages, Dr. Hunter found that 2195 contained one bedroom only, 2930 two bedrooms, and 250 more than two. The consequences of such a state of things, where there is a family of grown-up sons and daughters, may be easily imagined. He says, however, that the general result of his inquiries was a disbelief that public morality is vitally affected by the crowding in rural villages. Indeed, when a third bedroom exists, it is very rarely occupied by the family themselves, being generally let to one or more lodgers. Hence Dr. Hunter does not think it advisable to multiply the number of bedrooms in cottages. He gives a sketch of the plan which he would recommend for the building of a row of cottages.

In the 'Eighth Report'* is contained a report by Dr. Hunter "On the housing of the poorer parts of the population in towns." The broad results of this inquiry are stated by Mr. Simon as showing "that neither against degrees of crowding, which conduce immensely to the multiplication of disease [as well as to obvious moral evils, nor against the use of dwellings which are permanently unfit for human habitation, can local authorities in towns, except to a certain extent in some privileged places, exercise any effectual control. Resulting from (or at least attributable to) this powerlessness of the authorities, which only sometimes was supplemented by strained constructions of the law, the evils in question were found very abundantly, one or both of them, in operation. Especially were they seen abounding in some of the chief places which were visited—perhaps worst in parts of the metropolis, and in Bristol, Merthyr, Newcastle, Plymouth, and Sunderland."

The following are the powers which, in Mr. Simon's opinion, "it is most of all desirable that local authorities should be able and willing to exercise against the evils in question."

I. "To deal universally with overcrowding, on the basis of its being technically a 'nuisance,' and to take, as the sole test of overcrowding, the proportion borne by the number of occupants to the size and ventilation of given space."

(Mr. Simon thinks that the law ought not to be based on the assump-

* Appendix, p. 50.

tion that children require less breathing space than the same number of adults; and this for two reasons:—(1) Because even healthy children are, weight for weight, twice as powerful as adults in deteriorating the air they breathe; (2) because children almost invariably pass through febrile disorders, by which the requirement of space is greatly increased. It is also practically important that in the letter of the law there should be no distinction between overcrowding by a single family and by several, a discretionary power being given to magistrates to relax the law in certain cases when members of only a single family are crowded together.)

II. "To apply to the so-called 'tenement houses' of the poor a system of registration and regulation akin to that which is applied to common lodging-houses under the statutes of 1851 and 1853."

(Mr. Simon refers especially in his report to those "large but ill-circumstanced houses, once, perhaps, wealthily inhabited, but now pauperised, and often without a span of courtyard, either front or back; where in each house, perhaps, a dozen or more rooms are separately let to a dozen or more families, each family with but a room to itself and perhaps lodgers; and where in each house the entire large number of occupants (which, perhaps, even in England, may be little short of a hundred) necessarily have the use of but a single staircase, and of a privy which, perhaps, is placed in the cellar.")

III. "To enforce everywhere against the use of cellar-dwellings the restrictions which, under the 67th section of the 'Public Health Act,' are enforceable in places which are under that Act and the 'Local Government Act.'"

IV. "To exercise against premises or parts of premises which, by want of access of light or air, or by dampness, or through ruinous condition, are rendered unfit for human habitation, the same powers as against premises which by 'nuisances' are rendered unfit."

V. "To acquire premises by compulsory sale, either in order to make needful openings and clearances where ground is too closely built upon, or for other sanitary improvements."

Finally, Mr. Simon is in favour of the proposition that the local authority which is exercising improvement powers (and also, perhaps, individuals interested in the well-doing of workpeople) should have a *locus standi* for opposing the grant of compulsory powers of purchase to railway companies and others, except on condition that, where many habitations are destroyed, at least as many should be substituted for them.

Dr. Bristowe* reports on "Inquiries whether the Rag Trade is of influence in spreading Infections of disease." The circumstances which led to this investigation appear to be that two complaints had been made with reference to outbreaks of smallpox, which were believed by the complainants to have had their origin in the rag department of paper-mills. One of these outbreaks occurred in 1858 at Wraysbury and

* 'Eighth Report,' &c., Appendix, p. 196.

Colnbrook; the other, in the summer of 1864, at Thetford. In the first case the complaint was investigated at the time, with the result that it was left uncertain whether the disease might not have originated outside, and altogether independently of, the paper-mill to which it was attributed. The second case was examined into by Dr. Bristowe himself, who came to the conclusion that smallpox had really been introduced into the town of Thetford by rags used at a paper-mill there.

It was originally proposed that the inquiries should be extended to all occupations in which rags are used; but it was soon found that paper-making was the only one in which there was any probability that anything but negative results would be obtained. Dr. Bristowe visited 86 paper-mills in different parts of England. The result was that the principals and managers professed for the most part to be ignorant of cases in which smallpox or other infectious diseases had been introduced by means of rags, and that in the majority of mills which he visited the workpeople appeared to have no dread of such an occurrence, but that in a minority there was a tendency among them to attribute infectious diseases to this cause. In the aggregate, the evidence seems to show that smallpox and other infectious diseases are very rarely introduced into paper-mills by rags, but that their introduction by this means is possible, and occasionally takes place. Dr. Bristowe expressly states that the quality of the evidence collected by him in favour of the propagation of disease in this way is not very good. He considers that the apparent rarity of its occurrence is to be attributed to the following circumstances. In the first place, hospitals and other institutions in which infectious diseases are treated appear not to sell rags to rag-dealers, in this country at least; and he thinks that it is exceptional for even private persons thus to dispose of distinctly infected articles. Again, before rags reach the paper-mills they have been sorted and resorted two or three times, and have thus lost some of the deleterious qualities which they may have possessed. Lastly, the preliminary dusting which they undergo in the large mills again tends to deprive them of any infectious property. It is, of course, only during the earlier stages of paper-making that any danger can possibly exist. Dr. Bristowe does not suggest any precautionary measures, excepting the vaccination (or revaccination) of persons employed in the mills, and the making it a misdemeanour to sell, or knowingly to buy, rags which have been used about persons suffering from infectious diseases.

The epidemic of variola at Thetford, above referred to, took place under the following circumstances:—There had been no smallpox in the village for some years before. The first cases which occurred were those of two women, who were employed in cutting up some foreign rags. They did not live together, but the disease broke out in both of them on the same day. They lived in a low locality called Church Row, in which altogether 32 persons were attacked by smallpox. The third case was that of a boy who worked in the engine-room of the mill, but having communication with the rag-workers. He took

it about a week after the women. The epidemic lasted 6 or 7 months, and caused 16 or 17 deaths.

In the 'Eighth Report* of the Medical Officer of the Privy Council' Mr. Simon reports the recommencement of a systematic course of inspection of the different vaccination districts in England and Wales. It is very satisfactory to find that each inspector bears witness to an improvement in the performance of public vaccination since the last inspection, which occupied the years 1860-64. The improvement is particularly in the style of the vaccination. Dr. Seaton reports that whereas on his former inspections about 63½ per cent. of the children examined showed certain degrees of scantiness of scar, now only 42 per cent. show the same degrees of scantiness. At the same time, the improvement is not universal, nor is it always so great as is to be desired; and there are still some districts (among which is the "Black Country") where the vaccination is infamous. With reference to the amount of vaccination-scar necessary, Mr. Simon lays down the rule that it ought decidedly not to cover less than half a square inch, and that it is probably better for reaching three quarters of a square inch.

As regards the number of infants vaccinated in proportion to the number of births, no important general change appears to have occurred. The county of Northampton, and especially the Northampton Union, was noted before by Dr. Seaton as affording the most remarkable instance of the neglect of vaccination which had come before him. The public infantile vaccinations in this union were only 10 per cent. of the births, and accordingly the smallpox death-rate of children in this union between 1851 and 1860 was 4½ times as high as the average smallpox death-rate of England, and was greater than that of any other union, except Merthyr Tydvil and Plymouth. In 1856 nearly a third of the entire mortality of the Northampton Union, and in 1860 nearly a fourth of it, was due to this one disease. Dr. Stevens now reports that little or no improvement has taken place, and that this union is still a centre in which smallpox is almost constantly present, and from which it spreads to the neighbouring towns and villages. In Portsea Island and in the town and district of Leominster vaccination was very greatly in arrear. In Portsea Island the number of unvaccinated children amounted to thousands, when an epidemic began, in consequence of which the deaths from smallpox in one year amounted to nearly a fourth of the total average mortality of the union; and in Leominster there were in a few months between 40 and 50 deaths from smallpox.

While, therefore, as might be expected, the periodical inspections ordered by the Privy Council are of great value in impressing on the public vaccinators the importance of a thorough performance of the operation, it would appear that they do very little to make the general

* 1865, p. 7.

public more sensible of the absolute necessity of having their children vaccinated.

A paper by Lauth,* of Strasbourg, founded on a work 'Sur les Maternités,' by M. Léon Le Fort, contains some interesting information with reference to the causes which combine to favour the great mortality from puerperal fever in the different lying-in hospitals of Europe. 1. It has been found that season exerts a marked influence on the occurrence of epidemics of this disease. They do, indeed, arise at all periods of the year, but they are much more frequent and disastrous in winter than at other times. This is shown by Le Fort's tables to be the case in Paris, London, Vienna, and St. Petersburg. It appears, however, not to be due to the direct influence of cold in producing the disease, but to the difficulty of maintaining efficient ventilation during winter. 2. Concomitant epidemics do not affect the proportion of deaths from puerperal fever in lying-in hospitals. Epidemics of cholera, typhoid fever, smallpox, scarlatina, measles, erysipelas, have prevailed at Vienna, without influencing the death-rate in Späth's clinique, this having sometimes fallen to zero, while at other times it exceeded the mean. The same conclusion is favoured by the fact that the mortality varied greatly in the two clinics during the presence of the above-named epidemic diseases. 3. The length of time during which the women are kept within the hospital before their confinement is found to affect their health to a very remarkable extent.

A sort of acclimatization in fact occurs, which protects such women from the contagion of puerperal fever. This appears to have been first suggested by Lasserre in a thesis written by him. He found that of 791 women who were in the hospital more than a week before their confinement, only 18 died; while 17 died out of 528 whose stay was less than a week, and 52 died out of 1020 who were admitted after labour had commenced. Charrier obtained a similar result. Of 1868 women confined within ten days after their admission, 120 (about 1 in 15) died. Of 351 who were in the establishment more than ten days, only 9 died, or 1 in 38. Späth's observations, made at Vienna in 1862, yielded the following numbers, which, although not perfectly uniform, are quoted as pointing to the same conclusion:

Interval between admission and confinement.	Cases per cent.
From 2 to 7 days	25.4
„ 8 to 14 „	28.5
„ 15 to 21 „	20.3
„ 22 to 28 „	17.2
More than 28 „	19.1

Le Fort's inference from these figures is that, "if we except those women who are admitted after their confinement or during the course

* 'Ann. d'Hyg.,' 2dme sér., xxvi, p. 274.

of labour, we see that the liability to the disease (*la morbilité*) appears to diminish by acclimatization. It is especially remarkable that of 90 women confined at home, and brought to the hospital more or less quickly afterwards, one only was attacked by the disease; for this leads us to inquire whether contamination does not occur mainly and even almost solely at the time of labour." The question whether residence in an hospital in which puerperal fever prevails can give rise to disease during pregnancy appears to be answered in the negative by the observations of Tarnier, who says that, among 2237 women confined in the Maternity during 1856, only a single case of this kind occurred, and even that one was disputed. The statements of M. Pajot lead to the same conclusion. In 1862 puerperal fever prevailed epidemically in his wards, so that of 400 women who were confined, 100 fell ill, and 30 or 40 died. During this time nearly a hundred women were admitted into the hospital some days or even weeks before the termination of pregnancy. These women were scattered throughout the wards in which the disease prevailed, but no one of them became ill.

The epidemic of cholera in this country during the past year (1866) has led to an immense mass of writings upon the disease. In this part of the Retrospect I am concerned merely with those papers which deal with the disease from the point of view of public health; but even these are so numerous that I shall have to content myself with a very imperfect account of them. The prevalent opinion with reference to the mode of propagation of cholera was supported by Mr. Simon in an official memorandum issued in July, 1866. In this document he assured the public that cholera is so little contagious, in the sense in which smallpox and typhus are commonly called contagious, that, if proper precautions are taken where it is present, there is scarcely any risk that the disease will spread to persons who nurse and otherwise closely attend upon the sick. He supported with the weight of his authority the following doctrines:—That all matters which the patient discharges from his stomach and bowels are infective; that the patient's power of infecting other persons is due entirely, or almost entirely, to these discharges; that these, however, are comparatively non-infective when first discharged, but afterwards, while undergoing decomposition, acquire their maximum of infective power; that, if cast away without previous disinfection, they impart their own infective quality to other excremental matters; that, if they get access, even in the smallest quantity, to wells or other sources of drinking-water, they may infect very large volumes of water; that the infective influence of choleraic discharges attaches to whatever bedding, clothing, towels, and like things, have been imbued with them; and that thus even a single case of cholera may exert a terrible power over large masses of population if local circumstances co-operate. He, at the same time, insisted on the fact that the choleraic infection does not seem able to injure any population unless local circumstances are favorable, and, chiefly, unless the drinking water is impure or the drainage imperfect.

With reference to the sources and distribution of the epidemic of

cholera through Europe in 1855, the report of Mr. Radcliffe * gives very full information. Cholera broke out in Mecca early in May, 1865, among the pilgrims who had congregated there in unusual numbers. At that time cholera was prevalent at two points on the Arabian coast, in the Bombay Presidency, and at Aden. Since 1862 it had existed in China, Cochin China, and the Eastern Archipelago. Hence the exact source of the disease among the pilgrims at Mecca could not be ascertained; but it is at least known that in March, 1865, cholera prevailed among the pilgrims brought to Jedda (the principal trading port of Arabia) by two ships which had touched at Makalla, where the disease then existed. It does not appear, however, that at this time the disease was actually carried to Jedda. By the pilgrims returning from Mecca cholera was distinctly introduced into Suez on May 21, and into Damanhour on May 22; and on June 2 a case of cholera was recognised at Alexandria, among the inhabitants who were in contact with pilgrims. The presence of epidemic cholera in the city last mentioned was officially recognised on June 11, and between that date and the 14th foul bills of health were issued to vessels leaving the port.

Before the close of the month the disease had broken out in an epidemic form in Cairo. On the 20th of June it appeared at Valetta (Malta), on the 24th at Smyrna, and on the 28th at Constantinople. In the beginning of July it showed itself almost contemporaneously in Jaffa and Beyrout on the east coast of the Mediterranean, in Valentia on the west, and in Ancona on the Italian shore of the Adriatic. On the 19th of July the first case occurred at Gibraltar, and on the 22nd in Barcelona. The disease was officially recognised as present in Marseilles on the 23rd; but it has since been stated that it existed there as early as the 18th of June. The chief places in western Europe attacked by it in August seem to have been Madrid and Toulon; about the middle of September it appeared in Paris, and on the 17th it broke out at Southampton. At the end of the month a case of cholera occurred at Epping, and this was followed by several other cases, so that the disease prevailed in this locality during the first ten days of October. With these exceptions England remained free from cholera during 1865; but on November 3rd a steam-vessel from London, *viâ* Havre, reached New York with several cases on board. The vessel was subjected to a strict quarantine, and the disease did not spread beyond the captain and passengers.

The following are stated by Mr. Radcliffe to be the principal differences between the recent epidemic of cholera in Europe and those which occurred in former years:—1. For the first time in the history of epidemic cholera Europe has been invaded from the south. In the two great epidemics of 1829-32, and 1845-8, the disease spread from Persia to Russia, and thence along the Danube into central Europe. In our own country the towns first attacked on all previous occasions were seaports on the east coast. 2. A remarkable feature in the present epidemic has been its rapid and great extension along the coast-

* 'Eighth Report of the Medical Officer of the Privy Council,' Appendix, p. 306.

line, as compared with its slight and sluggish penetration inland. The central districts of Europe escaped altogether during 1865, except that there was an isolated outbreak in Saxony. 3. The progress of the disease was much more rapid than in former epidemics. In 1829 cholera took fifteen months, from the time of its entrance into Europe, to reach Great Britain; two years, less one month, to arrive on the North American coast. In 1848 its diffusion occupied nearly the same periods of time. In the recent epidemic the disease had, in less than five months, spread from Alexandria to the coasts of the Euxine, and even to the western hemisphere. 4. The swift propagation of the epidemic does not appear to have been dependent on any peculiar virulence of the disease. Gibraltar is the only place in which the mortality is known to have been greater than in any previous epidemic.

The two outbreaks in this country during 1865 are made the subject of special papers in the 'Eighth Report,' &c. That which occurred at Southampton is most ably treated of by Prof. Parkes. The exact way in which the disease was introduced into the port could not be ascertained. Two of the Peninsular and Oriental Company's ships, which arrived in Southampton on the 10th and 22nd of July respectively, had had fatal cases of cholera on board during the voyage home, and the property of some of the victims was ascertained to have passed into the possession of persons living in the town. The first case of undoubted cholera at Southampton was observed on the 22nd of September. After this cases continued to occur for about six weeks in the town and its neighbourhood, the total number being 60, of which 35 terminated fatally. A strong point in favour of the view that the disease was introduced from the Mediterranean by ships coming thence is undoubtedly furnished by the fact that Southampton was the only port at which ships arrived having had cholera deaths on board shortly before reaching England. In fact, it had actually been predicted that the disease would enter the country by Southampton, and not, as before, by towns on the east coast. The fulfilment of these prophecies will, no doubt, as Prof. Parkes says, seem to many persons sufficient evidence that the outbreak at Southampton arose in this way.

The source of the cases at Theydon-Bois, near Epping, again, could not be clearly traced. The commencement of the disease in this locality corresponded with the return of a gentleman and his wife to Theydon-Bois from Weymouth, where they had been staying. The gentleman was, in fact, the first person to be attacked, having been ill before he left Weymouth. He completely recovered, but his wife was seized with early symptoms while on the journey homewards, and ultimately died. Five days after her illness commenced one of her daughters became ill and rapidly died, and afterwards other cases occurred in the same small circle, the total number amounting to eight. Mr. Simon insists on the fact that the drinking-water of the house came from a well into which there was habitual soakage from the water-closet.

We are, perhaps, as yet hardly in a position to say what conclusions

may hereafter be drawn from the epidemic of cholera which prevailed in London during 1866; but, so far as the facts have been ascertained, it cannot be denied that they are greatly in favour of that theory which attributes the spread of the disease mainly to water-supply. These facts are urged very strongly by Dr. Farr,* in his address on public health, read before the Social Science Association at Manchester. "In East London," he says, "3613 people perished in six weeks. The great destruction of life occurred in every district, nearly every sub-district, supplied from the Old Ford reservoirs of one of the eight London companies (the East London Company), and to the same extent nowhere else. These reservoirs are close to the Lea, which is a tidal river, polluted with the sewage of West Ham and of East London. . . . Circumstantial evidence irresistibly points out that polluted water was distributed over all the area of extraordinary mortality during a certain number of days, with the same result as in previous epidemic years. The source of mischief was no sooner pointed out than the plague began rapidly to decline. . . . We now know how Asiatic cholera may be subdued."

The freedom of the south of London from cholera, as compared with the prevalence of this disease during previous epidemics, is referred by Dr. Farr to improved water-supply. In Southwark cholera raged both in 1849 and in 1854, when the water-supply (by the Southwark Company) was very impure. On the other hand, Lambeth, which suffered severely in 1849, escaped to a great extent in 1854, the water-supply having been much improved. In the past year the mortality from the disease was very trifling in each district, both being now supplied with the purer water.

For detailed information as to the distribution of the cases of cholera in the eastern districts of London, with reference to the water-supply, I may refer to the reports of the 'Lancet' Sanitary Commission† on the subject, and to the articles in the 'Medical Times and Gazette' of about the same date. It would be impossible to enter into this matter thoroughly without minute topographical details, and therefore I content myself with these simple references.

Concerning the disposition of cholera patients in hospitals, I cannot but make brief reference to the conclusions arrived at by the council of the Epidemiological Society.‡ They are as follows:—1. That it is, on the whole, unadvisable that cholera patients be admitted into the ordinary wards of general hospitals or infirmaries. 2. That cholera patients can be safely admitted into special wards in general hospitals, due precautions being taken; and that therefore it is desirable, as an important means of providing accommodation for the destitute when attacked, that the authorities of these institutions grant this valuable benefit to the public. 3. That it will be often necessary that special hospitals be provided in aid or in lieu of general hospitals and infirmaries.

The council further recommended that places of refuge should

* 'Medical Times and Gaz.,' 1866, Oct. 13, p. 399.

† 'Lancet,' 1866, ii, Aug. 11 and 25, pp. 157, 217.

‡ Ibid., July 28, 1866.

be provided for the temporary sojourn of some of the unattacked inmates of unwholesome dwellings and localities where the disease has appeared.

The principles on which disinfectants should be employed in the prevention of cholera are ably discussed in a paper by Professors W. Griesinger, Max v. Pettenkofer, and C. A. Wunderlich, which also contains general rules for the guidance of sanitary authorities, practitioners, and the public, during the prevalence of this disease. A translation is published, without curtailment, as an appendix to vol. xlv of the 'Half-yearly Abstract of the Medical Sciences.' It is stated that the main object is to prevent the spontaneous decomposition of the discharges, by which these acquire an alkaline reaction, and that the best and cheapest disinfectant is the sulphate of iron, or, in certain localities, the chloride of manganese. It is also recommended that carbolic acid in small quantity should be used in addition to the sulphate of iron. The writers of this paper are very doubtful as to the value of the chloride of lime.

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E R R A T A.

- Page 108, line 19 from top, for "emotion" read "motion."
 Page 108, line 25 from top, for "physiological" read "psychological."
 Page 110, line 10 from top, for "aphonia" read "aphæmia."
 Page 114, line 19 from top, for "affected" read "afforded."
 Page 115, line 5 from bottom, for "prominent" read "permanent."
 Page 116, line 12 from top, for "some" read "severe."
 Page 116, line 23 from top, for "muscles" read "nucleus."
 Page 116, line 24 from top, for "and" read "have."
 Page 116, line 32 from top, for "was paralysis" read "was no paralysis."
 Page 123, bottom line, for "long" read "by."
 Page 124, line 25 from top, for "disease" read "disuse."
 Page 214, line 22 from top, for "emphysema" read "empyema."
 Page 331, line 8 from top, for "journal" read "author."
 Page 375, line 21 from top, for "ibid." read "Obst. Trans., viii, 1866."
 Page 423, line 13 from top, for "pupil" read "papilla."
 Page 423, line 16 from top, for "pupils" read "papillæ."
 Page 425, line 12 from bottom, for "idiopathis" read "idiopathic."
 Page 431, line 20 from bottom, for "frunæ" read "frenum."



